

The **Communicator**

April 2019



SARC



Antenna Building Issue

A Publication Of Surrey Amateur Radio Communications

April 2019



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The **Communicator** is a publication of Surrey Amateur Radio Communications. It appears monthly, except July and August, for area Amateur Radio operators and beyond, to enhance the exchange of information and to promote ham radio activity.

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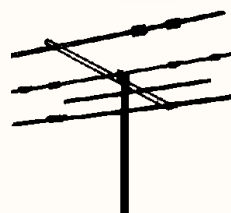
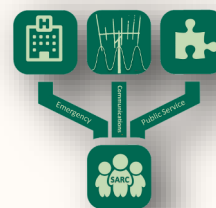
Regular readers who are not SARC members are invited to contribute a \$5 annual [donation](#) towards our Field Day fund via [PayPal](#).

SARC maintains a website at www.ve7sar.net and a Digital Communicator at ve7sar.blogspot.ca that includes recent news, past issues of The Communicator, our history, photos, videos and other information.

IN THIS ISSUE

click on the page number below

QRM	3
The Rest Of The Story—Alessandro Volta	4
Back To Basics—Ohm's Law	7
Wire Snippets	11
What's Happening This Month In Ham?	12
News You Can Lose—Ham Humour	13
SARC News	14
Field Day	17
Surrey Operations & Training Centre News	18
The Contest Contender	19
Radio-Active	21
Radio Ramblings	23
Public Service Comms—SEPAR Report	28
Foundations of Amateur Radio	30
No-Ham Recipes	33
Tech Topics	36
Antenna Adventures	44
More Tech Topics	73
QRT	77



On The April Cover...

April is a month of surprises, especially on the first day with 2 BIG breaking stories on page 13. Other than that we have lots of antenna projects and information in this issue.



QRM

---... ---

...from the Editor's Shack

*Do you have a photo or bit of SARC news to share?
An Interesting link?*

*Something to sell or something you are looking for?
eMail it to [communicator @ ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.*

This issue of 'The Communicator' has been a few years in the making. The subject of building your own antennas comes up frequently and is also part of our SARC-SEPAR Basic Licensing course. I've been wanting to put some of my favourite antennas together as a reference for new hams, but I decided that putting them in one issue would reach a larger audience.

During each course we host a Saturday morning antenna building workshop, provide the materials and the participants cut, solder and assemble their own J-Pole antenna. For many it's the first time they have attempted a project like this and the level of satisfaction is evident when they put it on the analyzer and adjust the SWR to minimum. It's a great way to reinforce the classroom learning. As a bonus, the antenna works great as well and performance is incomparably superior to the stock 'rubber duckie' that comes with most handheld transceivers.

Response to our Antenna Workshop has always been favourable and making antennas is generally within the capabilities of everyone, so we include a number of designs and applications this month.

I recently purchased a new (to me) dual-band Kenwood TM D-710G. It wasn't that I needed another VHF-UHF

transceiver, I have several, but what attracted me to this radio was the built-in TNC and the capability to work digital satellites. I thought it best to get used to this radio on the analog sats first so I set up for a nice high AO-91 pass just before noon on March 4th.

I set one side of the radio to the VHF receive frequency and in the other I had programmed 6 UHF memory channels for the rise, maximum and descent to compensate for the Doppler effect. I set up my iPhone to record the pass, as I usually do, because it can be difficult to hold a mic, Arrow antenna and log at the same time. The transceiver worked fabulously and I made four contacts. Great, now to record the details in my log! The phone had not recorded. @#*?&! Fortunately, a noon-time pass a week later worked better for me with five confirmed contacts. I'll be experimenting with the digital sats and reporting back in a future Communicator.

We have a fabulous guest speaker program lined up this month. Alex Schwartz VE7DXW will present on his RF Seismograph. It has been in the news lately because of the correlation that has been found with RF interference and earthquake prediction.

~ John VE7TI
Communicator Editor

On the Web

ve7sar.net

Between newsletters, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

Click the links below to follow our presence on the web:

SARC Blog

ve7sar.blogspot.ca

Twitter

[@ve7sar](https://twitter.com/ve7sar)

FaceBook

[SurreyAmateurRadio](https://www.facebook.com/SurreyAmateurRadio)

Our YouTube Channel

[SurreyARC](https://www.youtube.com/SurreyARC)

SARC Photo Albums

Web Albums

or

tinyurl.com/SARCphoto

The thing to remember is that the future comes one day at a time.—Dean Acheson

April 2019



The Rest Of The Story...

Hidetsugu Yagi

And Mr. Uda?



Hidetsugu Yagi

Professor Hidetsugu Yagi [left] was born January 28 1886 in Osaka prefecture, Japan. Not many details are available about his early life, but he graduated in engineering from Tokyo Imperial University in 1909.

Shintaro Uda [right] (June 1, 1896 - August 18, 1976) was a Japanese inventor, and assistant professor to Hidetsugu Yagi at Tohoku University, where together they invented the Yagi-Uda antenna in 1926.

This profile will focus primarily on Mr. Yagi because Mr. Uda does not have a high profile in the history books despite the significance of their joint developments in the field of antenna design, specifically the Yagi-Uda directional 'beam' antenna.

After graduating, Yagi went to Germany, where he continued his education under the direction of Heinrich Barkhausen, inventor of the Barkhausen oscillator.

Yagi's research in Germany concerned resonant transformers used in wireless systems. The outbreak of the First World War forced his hurried departure, leaving all his experimental data behind. He later published a paper on the theoretical part of this research in the December 1917 Proceedings of the Institute of Radio Engineers.

Yagi had fled Germany to Great Britain where he studied with John A. Fleming until 1916. Before returning to Japan, Yagi visited the United States and spent some time at Harvard University with George W. Pierce. Yagi then began his teaching career at Tohoku Imperial University, which awarded him a doctorate in engineering in 1919.

At Tohoku University, Yagi initiated a research program in radio-electronics, drawing on the knowledge that he had learned with Barkhausen, Fleming, and Pierce. Other members of the faculty and advanced students, including Okabe and Shintaro Uda, became participants in a collective research effort.

A perceived need for better communication between islands and with ships led them to focus on short wave communication with directive antennas. The Yagi group received financial support for the research from a private foundation in Sendai.

In 1925 Yagi and Uda published their first report on the wave projector antenna in a Japanese publication. In the paper, they discussed the design and performance of a directive antenna that they called a "wave projector" or "wave canal" and which had been developed at the University.



Shintaro Uda

The antenna employed a number of parasitic elements called directors and reflectors and would come to be commonly known as the Yagi antenna or (as it should properly be called) Yagi-Uda antenna.

In February 1926, Yagi and Uda published their first report on the wave projector antenna in a Japanese publication. Yagi applied for patents on the new antenna both in Japan and the United States. His U.S. Patent 1,860,123 ("Variable Directional Electric Wave Generating Device") was issued in May 1932 and assigned to the Radio Corporation of America.

Yagi made another visit to the United States in 1928 and gave talks on the Japanese short wave research at Institute of Radio Engineers meetings in several cities and for a group of engineers at General Electric.

His visit stimulated a renewed interest in magnetrons at GE and they developed a 400-MHz magnetron and tested it with a wave projector during the summer of 1928.

The Bureau of Standards engineers also used a Yagi-Uda antenna in an experimental aircraft landing system in 1930.

In 1933 Yagi moved to Osaka Imperial University, the newest and the last Imperial University established with the support from the industry rather than the government, as the 1st chair of the physics department in the faculty of science, the director of a laboratory where developmental work on radar took place. Yagi promoted pure science and encouraged the younger professors and researchers to pursue fundamental physics rather than applied physics, while doing the applied part himself to fulfil the industry's needs. Also that year the short-wave system developed at Tohoku University was used to establish a government radio telephone link between Sakata and Tobishima Island, a distance of about 40 km.

In 1939 he was made Dean of the Faculty of Science at the Osaka Imperial University. In 1944 he became President of the Technology Institute of the Cabinet.

Yagi served as a Civilian Consultant on radar and communication to the Japanese military during World War II. Unfortunately his home, library and most of his personal papers were lost during a bombing raid in April 1945.

Soon after the end of the war he was interviewed by Roger I. Wilkinson, William R. Hewlett and others concerning Japanese developments during the war. In these interviews Yagi expressed frustration over the poor communication and cooperation between the military services and civilian experts.

Gentai Sato, who studied under Yagi, wrote about the surprise to the Japanese when they captured British radar systems equipped with Yagi antennas and a document on Yagi arrays found when Singapore was taken. Sato also noted the irony of the American use of Yagi antennas to determine the height of the explosion of the atomic bombs dropped on Japan.

After the war Yagi served as a consultant on the technological rehabilitation of Japan and assisted in the formulation of television standards. In 1946 he was installed as the 4th President of Osaka Imperial University, and was also President of Japan Amateur Radio League (JARL). He also served as president of the Yagi Antenna Company and was awarded Japan's Order of Cultural Merit in 1956. He died on January 19 1976, just 9 days short of his 90th birthday.

Yagi was an excellent manager and producer of science, though his methods were, sometimes, unorthodox. It is reported that Professor Yagi had a sharp tongue and



In 1926, Professor Hidetsugu Yagi and his assistant, Shintaro Uda published on the sensitive and highly-directional antenna they designed and constructed using closely-coupled parasitic elements. The antenna, which is effective in the higher-frequency ranges, has been important for radar, television, and amateur radio.

April 2019

encouraged Dr. Hideki Yukawa in very special way with the bitter words "We originally planned to employ Dr. Shinnichiro Tomonaga. However since your elder brother begged us to employ you, we recruited you instead. Please do not make us disappointed. Work harder than Dr. Tomonaga".

Shortly afterwards Dr. Yukawa published his first paper which later brought him the 1st Nobel Prize in Japan. It is believed that the words of Professor Yagi urged Dr. Yukawa to publish his MESON theory although nobody knows what really happened between Professor Yagi and Dr. Yukawa.

When Shintaro Uda visited the United States in 1951 he expressed astonishment at the ubiquity of the Yagi-Uda antennas used as home television antennas.

On April 18, 1985, the Japan Patent Office selected him as one of ten Japanese Great Inventors

And that... is the rest of his story.

~

The Yagi-Uda Antenna

A three-element Yagi-Uda antenna used for amateur radio. The longer reflector element (left), the driven element (center), and the shorter director (right) each have a so-called trap (parallel LC circuit) inserted along their conductors on each side, allowing the antenna to be used at two different frequency bands.

The topic of wireless communication, which he pursued during his studies abroad, would become a research theme to which he would dedicate his entire life. In 1919, he became a professor at the Faculty of Engineering Sciences of the Tohoku Imperial University which was then established and during the same year he also attained the title of Doctor of Engineering. He was able to foresee that short waves or ultra short waves would become the main element for communication using radio waves and he aimed his research in this direction. This resulted in the publication of his papers called "Generation of Short Wavelength Waves", "Measuring Specific Wavelengths with Short Wavelengths", and other papers. The so-called Yagi antenna is based on these published articles. He invented it as an antenna using his "method for directional electric waves". He obtained the patent rights to his invention (patent number 69115, issued in 1926).

Because this invention uses a very simple construction, it enabled directional communication with electric waves. This construction is still used basically in any type of antenna which is used today for ultra short or extremely short waves.





Back to Basics

John Schouten VE7TI

From The Canadian Basic Question Bank

This month a closer look at Yagi Antennas...

B-006-011-001 How many directly driven elements do most Yagi antennas have?

- A. One
- B. Two
- C. Three
- D. None

A Yagi-Uda antenna, commonly known as a Yagi antenna, is a directional antenna consisting of multiple parallel elements in a line, usually half-wave dipoles made of metal rods. Also called a "beam antenna", or "parasitic array", the Yagi is very widely used as a high-gain antenna on the HF, VHF and UHF bands. It has moderate to high gain which depends on the number of elements used, typically limited to about 20 dBi. It is lightweight, inexpensive and simple to construct. The bandwidth of a Yagi antenna, the frequency range over which it has high gain, is narrow, a few percent of the center frequency, and decreases with increasing gain, so it is often used in fixed-frequency applications. The largest and best-known use is as rooftop terrestrial television antennas, but it is also used for point-to-point fixed communication links, in radar antennas, and for long distance shortwave communication by shortwave broadcasting stations and radio amateurs.

Origins

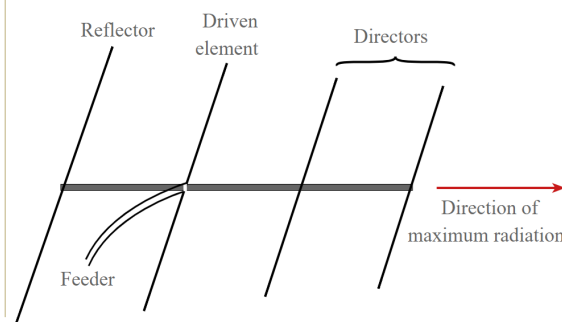
The antenna was invented in 1926 by Shintaro Uda of Tohoku Imperial University, Japan, with a lesser role played by his colleague Hidetsugu Yagi. However the "Yagi" name has become more familiar with the name of Uda often omitted. This

appears to have been due to Yagi filing a patent on the idea in Japan without Uda's name in it, and later transferring the patent to the Marconi Company in the UK.

Yagi antennas were first widely used during World War II in radar systems by the British, US, Germans and Japanese. After the war they saw extensive development as home television antennas.

Description

The Yagi-Uda antenna consists of a number of parallel thin rod elements in a line, usually half-wave long, typically supported on a perpendicular crossbar or "boom" along their centers. There is a single driven element driven in the center (consisting of two rods each connected to one side of the transmission line), and a variable number of parasitic elements, a single reflector on one side and optionally one or more directors on the other side. The parasitic elements are not electrically connected to the transmitter or receiver, and serve as passive radiators, reradiating the radio waves to modify the radiation pattern. Typical spacings between elements vary from about 1/10 to 1/4 of a wavelength, depending on the specific design. The directors are slightly shorter than the

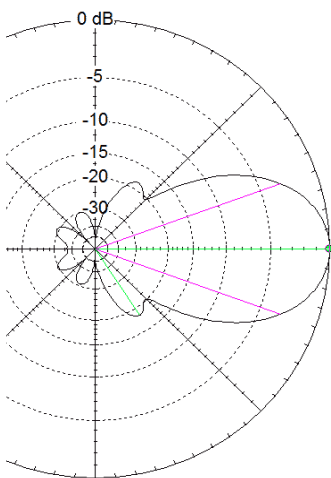


Also called a
"beam antenna", or
"parasitic array"...

April 2019

driven element, while the reflector(s) are slightly longer. The radiation pattern is unidirectional, with the main lobe along the axis perpendicular to the elements in the plane of the elements, off the end with the directors.

Conveniently, the dipole parasitic elements have a node (point of zero RF voltage) at their centre, so they can be attached to a conductive metal support (the boom) at that point without need of insulation, without disturbing their electrical operation. They are usually bolted or welded to the antenna's central support boom. The driven element is fed at centre so its two halves must be insulated where the boom supports them.



Yagi radiation pattern

The gain increases with the number of parasitic elements used. Only one reflector is used since the improvement of gain with additional reflectors is negligible, but Yagis have been built with up to 30-40 directors.

The bandwidth of the antenna is the frequency range between the frequencies at which the gain drops 3 dB (one-half the power) below its maximum. The Yagi-Uda array in its basic form has very narrow bandwidth, 2-3 percent of the centre frequency. There is a tradeoff between gain and bandwidth, with the bandwidth narrowing as more elements are

used. For applications that require wider bandwidths, such as terrestrial television, Yagi-Uda antennas commonly feature trigonal reflectors, and larger diameter conductors, in order to cover the relevant portions of the VHF and UHF bands. Wider bandwidth can also be achieved by the use of "traps", as described below.

Yagi-Uda antennas used for amateur radio are sometimes designed to operate on multiple bands. These elaborate designs create electrical breaks along each element (both sides) at which point a parallel LC (inductor and capacitor)

circuit is inserted. This so-called trap has the effect of truncating the element at the higher frequency band, making it approximately a half wavelength in length. At the lower frequency, the entire element (including the remaining inductance due to the trap) is close to halfwave resonance, implementing a different Yagi-Uda antenna. Using a second set of traps, a "triband" antenna can be resonant at three different bands. Given the associated costs of erecting an antenna and rotor system above a tower, the combination of antennas for three amateur bands in one unit is a very practical solution. The use of traps is not without disadvantages, however, as they reduce the bandwidth of the antenna on the individual bands and reduce the antenna's electrical efficiency and subject the antenna to additional mechanical considerations (wind loading, water and insect ingress).

As I mentioned at the beginning of this article, there are several questions in the Canadian Basic Question Bank that relate to Yagi antennas. Here are some additional concepts covered:

- B-003-009-001 In a Yagi-Uda 3 element directional antenna, the _____ is primarily for mechanical purposes. (Answer: Boom)
- B-003-009-002 In a Yagi-Uda 3 element directional antenna, the _____ is the longest radiating element. (Answer: Reflector)
- B-003-009-004 In a Yagi-Uda 3 element directional antenna, the _____ is not the longest nor the shortest radiating element. (Answer: Driven element)
- B-006-007-003 What electromagnetic wave polarization does a Yagi antenna have when its elements are parallel to the earth's surface? (Answer: Horizontal)
- B-006-011-001 How many directly driven elements do most Yagi antennas have? (Answer: One)
- B-006-011-005 What is one effect of increasing the boom length and adding directors to a Yagi antenna? (Answer: Gain Increases)
- B-006-011-006 What are some advantages of a Yagi with wide element spacing? (Answer: High gain, less critical tuning and wider bandwidth)



A 'Trap' on a Yagi element

(Continued on page 10)

Theory of Operation

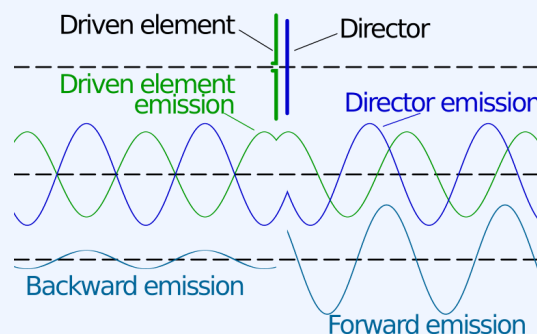
Consider a Yagi-Uda consisting of a reflector, driven element and a single director as shown here. The driven element is typically a $\frac{1}{2}\lambda$ dipole or folded dipole and is the only member of the structure that is directly excited (electrically connected to the feedline). All the other elements are considered parasitic. That is, they reradiate power which they receive from the driven element (they also interact with each other).

One way of thinking about the operation of such an antenna is to consider a parasitic element to be a normal dipole element of finite diameter fed at its centre, with a short circuit across its feed point. As is well known in transmission line theory, a short circuit reflects all of the incident power 180 degrees out of phase. So one could as well model the operation of the parasitic element as the superposition of a dipole element receiving power and sending it down a transmission line to a matched load, and a transmitter sending the same amount of power up the transmission line back toward the antenna element. If the transmitted voltage wave were 180 degrees out of phase with the received wave at that point, the superposition of the two voltage waves would give zero voltage, equivalent to shorting out the dipole at the feedpoint (making it a solid element, as it is). Thus a half-wave parasitic element radiates a wave 180° out of phase with the incident wave.

The fact that the parasitic element involved is not exactly resonant but is somewhat shorter (or longer) than $\frac{1}{2}\lambda$ modifies the phase of the element's current with respect to its excitation from the driven element. The so-called reflector element, being longer than $\frac{1}{2}\lambda$, has an inductive reactance which means the phase of its current lags the phase of the open-circuit voltage that would be induced by the received field. The director element, on the other hand, being shorter than $\frac{1}{2}\lambda$, has a capacitive reactance with the voltage phase lagging that of the current.

The elements are given the correct lengths and spacings so that the radio waves radiated by the driven element and those re-radiated by the parasitic elements all arrive at the front of the antenna in-phase, so they superpose and add, increasing signal strength in the forward direction. In other words, the crest of the forward wave from the reflector element reaches the driven element just as the crest of the wave is emitted from that element. These waves reach the first director element just as the crest of the wave is emitted from that element, and so on. The waves in the reverse direction interfere destructively, cancelling out, so the signal strength radiated in the reverse direction is small. Thus the antenna radiates a unidirectional beam of radio waves from the front (director end) of the antenna

The elements are not driven as such but receive their energy from the field created by the driven element, so we will find almost the opposite to be true. For now, consider that the parasitic element is also of length $\lambda/2$. Again looking at the parasitic element as a dipole which has been shorted at the feedpoint, we can see that if the parasitic element were to respond to the driven element with an open-circuit feedpoint voltage in phase with that applied to the driven element (which we'll assume for now) then the reflected wave from the short circuit would induce a current 180° out of phase with the current in the driven element. This would tend to cancel the radiation of the driven element. However, due to the reactance caused by the length difference, the phase lag of the current in the reflector, added to this 180° lag, results in a phase advance, and vice versa for the director. Thus the directivity of the array indeed is in the direction towards the director.



April 2019

(Continued from page 8)

- B-006-011-008 What does "antenna front-to-back ratio" mean in reference to a Yagi antenna? (Answer: The power radiated in the major radiation lobe compared to the power radiated in exactly the opposite direction)
- B-006-011-009 What is a good way to get maximum performance from a Yagi antenna? (Answer: Optimize the lengths and spacing of the elements)
- B-006-011-010 The spacing between the elements on a three-element Yagi antenna, representing the best overall choice, is _____ of a wavelength. (Answer: 0.2)
- B-006-011-011 If the forward gain of a six element Yagi is about 10 dB, what would the gain of two of these antennas be if they were "stacked"? (Answer: 13 dB)

Stacking refers to the simultaneous excitation of a number of similar antennas. The term comes from the appearance of antennas arrayed above one another in the vertical plane. You can stack Yagis vertically, horizontally, or even in depth. If you space the individual antennas properly, the overall gain increases 3 dB each time you double the number of antennas in a free-space array. So, when

your Yagi becomes unmanageably long, you simply replicate it - and make your antenna unmanageably high and wide, too!

The optimum stacking distance for most HF Yagis usually occurs somewhere 0.5 and 1 wavelength (because most HF Yagis are less than 1 wavelength boom length). The higher the individual Yagi gain, the wider the spacing required for optimum gain from the stack.

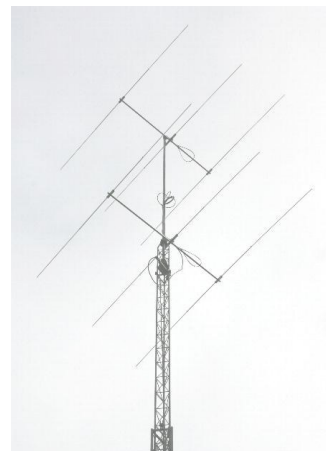
Longer boom length usually equates to higher gain in well designed antennas. Notice that for HF antennas stacking requires a tall tower.

Our initial question asked:

B-006-011-001 How many directly driven elements do most Yagi antennas have?

The answer is One. The other elements are either reflectors or directors. These are not driven and are typically attached directly to the boom.

~ 73, John VE7TI



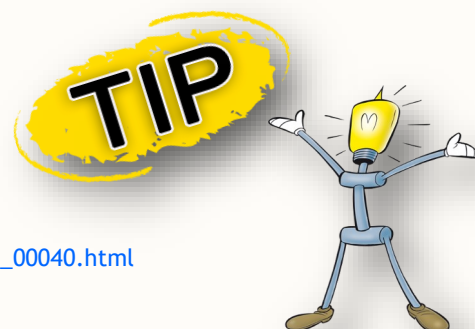
Study Links

Whether you are new to the hobby or brushing up on skills, you should find these study links helpful:

1. RIC-7 is the entire up-to-date Industry Canada (IC) Basic Question Bank. <http://tinyurl.com/CanadaBasicQB>
2. There is a RIC-7 that has some explanations along with the questions. [RIC-7 2014rev08.05 with explanations.](#)
3. The Amateur Radio Exam Generator is at: https://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html
4. The ExHaminer Study software for Windows is at: <https://wp.rac.ca/exhaminer-v2-5/>
5. There are plenty of good resources for both basic and advanced exam study courtesy of the Cold Lake Amateur Radio Society at: <http://www.clares.ca/va6hal%20training.html>

Contact SARC if you wish to write the Basic or Advanced Exam. If you pass we'll even give you a year's free SARC membership!

Newly Licensed? When you receive your paper license in the mail, it will come with a form that can be filled out and mailed to the Radio Amateurs of Canada office, at which point an introductory RAC one-year membership will be set up. Introductory memberships are identical to our existing basic memberships and you will receive the The Canadian Amateur magazine for one year.



Wire Snippets

The sun is quieter than normal, but don't panic, according to this CBC article:

<https://www.cbc.ca/news/technology/solar-activity-1.5049337?cmp=rss>

Bob KONR wrote: "We just got back from a very enjoyable trip to Roatan Island that included 8 friends vacationing together. The snorkeling and beach time were lots of fun." While there he worked some FT8 which led him to post the "Top Ten FT8 Advantages For Slackers".

The Dispatch reports on a vast, unseen world: Amateur radio operators using old and new technology to communicate globally

<https://www.cdispatch.com/lifestyles/article.asp?aid=72430>

Earth's magnetic field shifting rapidly but who will notice? Magnetic North is on the move - faster than expected. That's right, we know magnetic north moves around, but now it's happened at a surprising rate. Instead of waiting for the normal five year interval before an update on its position, NOAA have given us a fresh one a bit earlier.

<https://hackaday.com/2019/03/06/ask-hackaday-earths->

April 2019

April 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2 1930 SEPAR Net 2000 SARC Net	3	4	5	6 08-1000 SARC Social: Kalmar Family Restaurant King George Blvd & 81st Avenue RARC Swap Meet CONTEST: MS, MO QSO Party (all modes)
7 CONTEST: MS, MO QSO Party (all modes)	8	8 1930 SEPAR Net 2000 SARC Net	10 1900 SARC General Meeting	11	12	13 08-1000 SARC Social: Kalmar Family Restaurant CONTEST: NM, ND, GA QSO Party (all modes)
14 CONTEST: ARRL Rookie Roundup (SSB), and NM, ND, GA QSO Party (all modes)	15	16 1930 SEPAR Net 2000 SARC Net	17	18 World Amateur Radio Day (page 76)	19 Good Friday	20 08-1000 SARC Social: Kalmar Family Restaurant CONTEST: CQMM DX (CW), and Ontario QSO Party (all modes)
21 Easter  CONTEST: CQMM DX (CW), and Ontario QSO Party (all modes)	22	23 1930 SEPAR Net 2000 SARC Net	24 1900 SARC Exec Meeting	25	26	27 08-1000 SARC Social: Kalmar Family Restaurant CONTEST: FL QSO Party
28 CONTEST: FL QSO Party	29	30 1930 SEPAR Net 2000 SARC Net		For details on all SARC events, go to ve7sar.net For details on all SEPARS events, go to separ.shutterfly.com/calendar		



Page 13—News You Can Lose

The Lighter Side of Amateur Radio

Would-be Hams In Canada Rush To Get Certified Before New Rules Kick In

To the dismay of many Canadian hams, Spectrum Management of Industry, Science and Technology Development has recently announced that, given the growing importance of digital technologies for reliable radio communication and a desire to replace obsolete modes, it plans to re-introduce CW as a compulsory requirement of the basic amateur certification.

Further, government officials have revealed that those who earn their certification without CW endorsement before April 1, 2020 will be grandfathered, which has created a stampede of those aspiring hams who wish to beat the deadline.

In a further shocking development the government has revealed that in order to encourage more use of CW and conserve bandwidth, SSB is to be gradually phased out over a period of 5 years and therefore will no longer be legal after April 1, 2025.

Traditional Canadian amateurs who enjoy CW have welcomed this move as a forward-thinking initiative in keeping with the latest digital technologies but SSB operators are outraged and plan rallies in protest.

~ via John Brodie VA7XB



iCom Does It Again...

Always a leader in communications development, iCom today announced an addition to their stellar lineup of communications devices.

Using a new encoding technology dubbed “DigiTrix” the engineers at iCom have developed a method of transceiving the low HF bands in an Apple Watch app. The announcement was made on April 1st by iCom President Suay Aksoy and Tim ‘Apple’.

This is only the start of a line of devices to make HF more accessible. iCom will release a Bluetooth 1500 Watt amplifier and an automatic tuner later this summer.

April 2019



At The Last SARC Meeting...

March General Meeting

Wednesday, March 13, 2019

*Attendees: 29
Meeting Start: 7:05pm
Location: Surrey PREOC*

Announcements

Stan Williams VA7NF welcomed everyone to the meeting and announced that Treasurer, Scott Hawrelak VE7HA and Fred Reichstein VE7MPI were unable to attend due to illness and recent surgery (respectively).

Stan welcomed Tariq Rana VE7KPK who just passed his exam and Scott Thomas VE7KAT who just moved from Montreal back to Surrey.

Financial Report

No financial report since the Treasurer was absent.

Committee Reports

Membership

John Brodie: Unchanged since previous meeting.

Communicator

John Schouten: Nothing to report.

OTC

John Brodie: The beam has been repaired and it turned out it was a bad connector on the coax. It just so happened to occur during the coldest part of the year when it was difficult to do the work. A big thanks those that helped investigate: Michael, Jan, Steve, Anton. Also, the 40m inverted V was taken down as it was found to be inferior performer compared with the OCF dipole. The bandpass filters and

triplexers are being worked on by Les and John now and will be ready soon. We should be able to run two radios at high power simultaneously once they are complete.

The amplifier seems to be working fine now that we've updated the firmware. It's run through a few contests without issues.

We now have 3 radios setup in the OTC. The ICOM 765 ProII is now able to do voice keying with the use of the Signalink. John would like to purchase another headset for this radio at a cost of approx \$100. Carried.

Michael Birtles: The new Ultra-Quiet Honda 3000i ES inverter generator was purchased with gaming grant funds and is stored at the OTC. He also dropped off the old generator that was attached to Old Yeller for repairs at Fraser Valley Equipment. The compression test looks good and they will next work on the fuel system. Our concern was that water had entered via the broken gas cap. Fraser Valley Equipment is authorized to spend up to \$250, and if further costs will be needed they will call Michael.

Contest Group

Robert Gilchrist asked if there are any SSB contests in the near future.

CQWW WPX on March 30-31 is the next one. There also may be a few QSO parties in the US this upcoming weekend. If anyone has interest in a contest that the group is not yet participating you are welcome to use the OTC for a anytime you just need a director to open the facility for you.

Fox Hunt

Anton James: This year the date of the Fox Hunt has been set for Saturday May 11/2019. It's the same location as last year Crescent Park with entrance off 129/Crescent Road. Usual setup is 8:30am for a 9:30 am start. We usually go until about 12 pm with a BBQ and lunch following the hunt. If you have a 80m fox receiver kit built please bring it along. You are also welcome to bring family or friends along as they do not need a license to participate in the fox hunt.

Field Day

Jason Biggin: We've had 3 meetings of the FD committee so far and are still getting organized. The following priorities were determined by the committee: Contesting, Member Involvement, Emergency Operations/Public Service, Municipal Recognition, Mentoring, Recruitment. A survey was sent out to the membership and 70% of the respondents requested to participate in the field. We have had some discussions about switching field day venues to perhaps receive a larger amount of public traffic. We are using ICS (Incident Command System) to plan the event and previously prepared documents are being re-used for this. All positions of the ICS has been filled with the exception of the logistics chief. This open position of Logistics Chief is an opportunity for someone in the group to step up and volunteer their time. Please contact Jason Biggin via email ASAP if you are interested by this by Friday March 15/2019.

Logistics Chief responsibilities include:

- Facilities/Equipment
- Food Services
- Ensuring everything is there for the group to use.
- Trailer
- Tents
- Power
- Internet

Public Service Group

Stan Williams: We've been asked to help support the Vancouver Sun Run this year on

Sunday April 14/2019. Don Hamilton VA7GL is absent tonight but will be looking for volunteers to get involved soon.

Hyack Parade on May 25/2019 is another opportunity for public service. We have helped support this event in the past and may be asked this year.

Canadian National Parks On The Air Groups from Langley, Port Coquitlam, and Surrey are all interested in participating and this could become 2 month activation. Coordinator are Fred Orsetti VE7IO and Marcy Lui. We would be on the air just after Canada Day this year.

SARC/SEPAR

There are ongoing discussions with SEPARS, SFS, and City of Surrey on how all groups can coordinate activities together including the future of SEPARS. Gord Kirk VA7GK (absent) has taken the responsibility of SEPAR coordinator and is involved in these discussions.

Basic HAM Course

John Schouten: One person wrote their test early and got 100%. There is also a student who is involved in the NEPP (Neighborhood Emergency Preparedness Program) in Panorama Ridge. The course is being given in the NEW Surrey Fire Training Centre building next to the old building. The material for the course has been modified to fit the NEW 16/9 screens in the facility.

Surrey Doors Open 2019

<https://www.surrey.ca/culture-recreation/11056.aspx> Saturday June 8th 10am-4pm

John Schouten: SEPAR may be more active this year with the Fire department hosting their open house in Cloverdale which will allow sending messages back and forth between the two sites. The RCMP and Search & Rescue may have some interest in joining us at the OTC that day as well.

Weekly Net

Jinty Reid: The SEPAR net control script calls for the net controller to state there is a 5 min warning that the SARC net is about to start. This is difficult when the SEPAR net is running late and others are still having a conversation.

April 2019



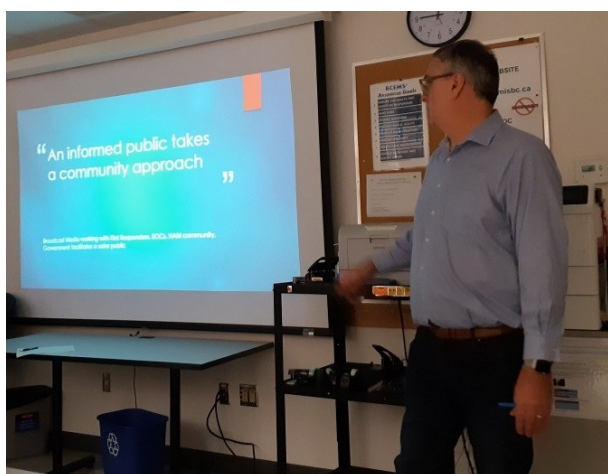
Discussion about the history of the net script being developed when the SEPAR net was much shorter and did not run into the SARC net. The recommendation from the floor was that the 5 min warning within the script could be considered optional.

— *Coffee Break* —

Feature Presentation (see below)

Meeting Adjourned: 9:05pm

~ Minutes prepared by Jeremy VE7TMY



Presentation:

Broadcast Media and Emergencies

Bruce Claggett VE7HHI, Senior Managing Editor at Vancouver AM radio station 'News 1130' was our guest presenter. Bruce is a BCIT journalism graduate and former faculty instructor who started his career as a summer announcer and feature reporter at Mountain FM in Squamish back in 1986. Since that time, he has been heard as a newscaster and reporter at CKCQ Quesnel, CFVR Abbotsford and CKNW Vancouver before News 1130.

Bruce gave an entertaining and informative look at newsroom operation, how they obtain their information and how staff responds. They operate 24/7/365 and are the only remaining full-time newsroom in the area. Aside from reporters, they operate an AirPatrol, news cruisers, and news stringers.

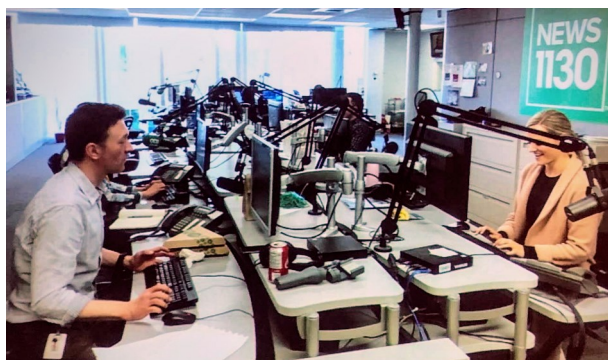


He related several interesting events experienced during his newsroom tenure. Aside from conventional broadcast sources and news gathering sites, like Associated Press and Reuters, much information gathering now comes from social media and from news tips provided by listeners via their cell phone.

Related to emergencies, they define significant news events as those related to weather, earthquakes, leaks and spills, major crashes, mass casualty accidents or terrorism, and war. Their responsibility is not only news, but to inform the public and, where possible suggest safe exit routes or shelter options. Their credo is: "An informed public is a safer public. Reach as many people as possible."

We were also provided some insight into the station's emergency broadcast capabilities, including standby power, alternate transmission sites and even transfer of operations to other stations.

The hour went by very quickly and Bruce answered many questions. Sincere thanks for this entertaining and enlightening presentation.





Field Day 2019

Jason Biggin VA7ITJ

As a committee, we first determined the goals for this year's field day event to align our activities. In our first meeting, we learned the following priorities in order: 1-contesting, 2-member engagement, 3-emergency operations/public service, 4-municipal recognition, 5-mentoring, 6-recruitment. These priorities are our guide as we decide on specifics for the event.

Our first priority, contesting, required further definition as it's gain can be marked in various ways. One way is only to consider points merited and endeavour to collect the highest sum. A particular method to achieve this is to limit our power output and utilize QRP operations. The less power employed merits the most significant points multiplier, with the highest at 5x. Although points are undoubtedly substantial, concentrating solely on this metric can result in a low quantity of high-value QSOs. These points would also likely be earned while trying to compete with high power stations, resulting in frustration. It was, therefore, determined to aim for higher volumes of contacts, using a variety of methods to facilitate enjoyable contesting.

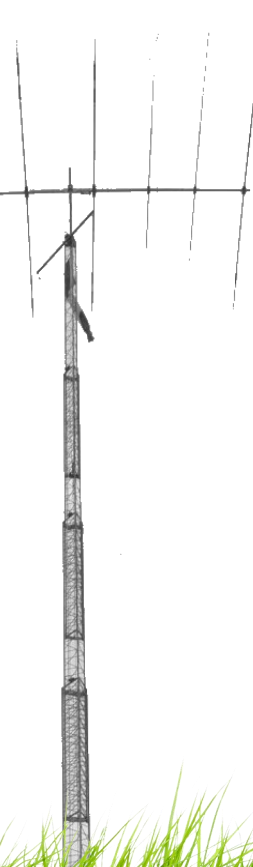
To help organize ourselves, we are utilizing the Incident Command System (ICS) which identifies the roles and responsibilities of our team. "ICS is a standardized on-site management system designed to enable effective, efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure" (ICS Canada). Using this system, we have identified the following roles: Incident Command (IC) - Jason VA7ITJ, Safety Officer - Nell VA7PE & Ralph VA7UB, Information Officer - John VE7TI, Liason Officer

- Gord VA7GK, Operations Chief - Michael VE7GMP, Planning, Logistics & Finance Chief - Jason VA7ITJ. Also noted are significant contributors: Jeremy VE7TMY, John VA7XB, Jim VE7FO, Pam VE7PFH, Don VA7GL, Steve VE7SXM, Stan VA7NF, Sheldon VA7XH. The ICS system has been utilized for previous field day events (for SARC and others) and brings with it a wealth of knowledge we can employ.

After a review of the survey results and options, we decided to select Grandview School as our venue. We took some time to discuss other options which included: Blackie Spit, South Surrey Recreation Centre, Tynehead Park and Green Timbers Park. These were identified as having more potential for exposure to the public. It was noted however that planning activities would have the most significant impact to draw the interested audience. We discussed that this could include various media formats and invitations. Although we are focusing on Grandview School, Tynehead and Green Timers will be prospects for next year's event. Efforts are underway to secure Grandview School, and we will report back when achieved.

Significant effort is required to host field day 'in the field,' and your assistance will be needed to make this event successful. Specifically, the logistics of the equipment pre-testing, moving, maintaining and decommissioning will require substantial effort. Please watch for targeted email requests to aid with specific tasks. I request that you respond in a timely fashion, indicating your ability to assist. Together, we can exercise our knowledge, skills and ability to make this year's event a success.

~Jason VA7ITJ



April 2019

Operations & Training Centre News

John Brodie VA7XB

Your Spring Update



The 10/15/20 m high power triplexer c/w bandpass filter project is now finished and installed at the OTC. Thanks to Les VA7OM for his herculean effort in getting the filters finished and tuned up.

The current task is now to complete the 80/40 diplexer and bandpass filters. This is proving more difficult than the 10/15/20 unit as both inductors and capacitors are large - and because the components are crowded within their enclosures, Les has found that the most meticulous tuning is undone when the box lid is put on (thus affecting the inductance of the coils) and the process has to be repeated. At the time of writing, we are considering how to overcome this difficulty.



A full report on these construction projects, with specs on swr, insertion loss and band isolation, will be prepared for next month's edition of the Communicator once all the remaining hurdles are overcome and testing is complete.

A word of caution to those contemplating building similar units. They are not simple to construct or to tune. Doorknob (high voltage) capacitors are expensive and difficult to find - most come from Eastern Europe. You will need lots of detailed advice from someone who has done it before. We have exchanged countless emails with our willing

mentor, Pavel VA7AM in the course of building and tuning. Many adjustments to the layout will prove necessary and much trial-and-error is involved. Furthermore, sophisticated instruments are required for final tuning. For this, Les uses a home-built VNA.

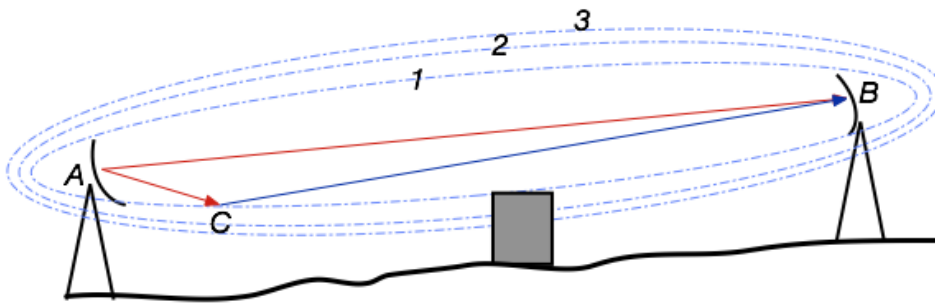
What exactly is a VNA (vector network analyzer)? Since I didn't know either and I thought this was a good opportunity to learn, I looked it up. What I found out is summarized elsewhere in this Communicator.

On another note, one of the highest priority challenges we yet need to address at the OTC is to find a way to connect to BC WARN, the microwave network which provides Internet connectivity when commercial services have failed (see <http://ve7wnk.ca/?ag=bcwarn>).

The ability to have secure communication within Surrey and to external communities is essential for the OTC and, incidentally, is also a key component of our plan for the NEPP Neighbourhood Emergency Planning Program of Panorama Ridge area of Surrey (discussed in previous Communicators). While we appear to be mostly equipped to make this link, what is missing is an unobstructed path to the Concord tower where our repeater and BC WARN antennas are located. At the lower edge of our line-of-sight is the roof of a tall townhouse complex on the edge of the RF path preventing a clear signal from being received, a problem known as Fresnel interference.

Wikipedia describes Fresnel interference this way: In any wave-propagated transmission between a transmitter and receiver, some of the radiated wave propagates off-axis (i.e. not on the line-of-sight path between transmitter and receiver). This can then deflect from objects and then radiate to the receiver.





In any wave-propagated transmission between a transmitter and receiver, some of the radiated wave propagates off-axis

However, the direct-path wave and the deflected-path wave may arrive out of phase leading to destructive interference, see https://en.wikipedia.org/wiki/Fresnel_zone) This appears to be our problem exactly.

The solution for us is to raise either the transmitting antenna or the receiving antenna. In our case, we believe that 20 or 30 ft of additional height will suffice to clear the obstruction. A feasible means of achieving this at the OTC is under consideration by the Executive, and further details will be reported as we move along.

~ 73, John VA7XB

The Contest Contender

John Brodie VA7XB

The Final Seasonal Contests



Now that winter is winding to a close, the weather has taken a significant turn for the better and we all start to think of outside activities.

Nevertheless the contest season is not quite over. Coming up this month we have states/provinces QSO parties on every weekend of April, including Ontario's on 20-21 April. These are typically all mode contests so whether you prefer CW, SSB or digital, there are several from which to choose.

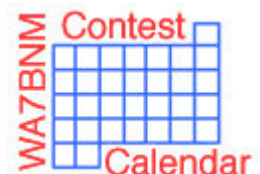
The ARRL Rookie SSB Roundup on 14 April is especially designed for the newly certified hams. The atmosphere is friendly and low-key, and everyone understands that your skills may not be quite up to standard. Rookies will attempt to make as many

contacts as possible during this 6-hour event. Rookies work everyone - and non-Rookies work only Rookies. If you are a graduate of the latest basic class this may be the one to get your feet wet so you are prepared for Field Day.

See the calendar in this Communicator for a listing of some of the more popular contests. A complete list may be found on WA7BNI's Contest Calendar:

<https://www.contestcalendar.com/contestcal.html> which also provides links to contest rules.

~ 73, John VA7XB



April 2019



Tidbits from the Amateur Radio World

An IOTA Adventure In The Gulf of St. Lawrence

Driven by the need for good pileups, like at his contest station in Russia (RTOC), Mike has ventured to many islands where IOTA hunters keep him in solid pileup mode. When he ran out of islands of interest in BC, he began traveling further afield, including Alaska and out east. Tonight, Mike talked about his trip to Iles-de-la-Madeleine, specifically, Havre Aubert Island, and then Harrington Harbor, both in the province of Quebec, in April 2018.

It was springtime, by the calendar, but winter had not given up its grasp on these islands in the Gulf of St. Lawrence. Digging 32 radials out from under a deep blanket of white on the last day on Iles-de-la-Madeleine was cold and time-consuming, but necessary for the next stop. Wind made the Spiderbeam mast look like a fly-fishing rod, and if guyed, move like a belly dancer. Taking sections out helped solve that problem at both locations.

Overall, 6,010 QSOs total on CW and SSB at Iles-de-la-Madeleine and 6,611 QSOs total at Harrington Island. And a lot of happy IOTA hunters near and far.

Iles-de-la-Madeleine is an archipelago of seven inhabited islands.

Harrington Harbor is essentially a big granite rock, and a network of boardwalks crisscrosses through the community, connecting houses, businesses and

places of interest to visitors.

Mike's IOTA adventures appear to be fun and rewarding from an operating perspective as well as a travel perspective. But the level of success is undoubtedly

dependent on the amount of planning and preparation that goes into the idea, and perhaps some Plan B and Plan C thinking, too, just in case plan A gets derailed. The commentary and photos from his VE2 trip attest to what happens when the weather turns, since wind, rain, snow and ice can create unexpected problems, from delays in travel to power outages to antenna challenges.

Sometimes, too, satellite maps don't provide a particularly accurate picture of the location, or areas that appear open and clear on Google Maps aren't so open and clear when there's snow on the ground and the locals are no-roads-bound on snowmobiles.

So regardless of how much planning and preparations go into a travel-and-radio adventure, success often depends on a fine-tuned ability to adapt to circumstances. Alternatives must be considered with regard to vertical setup, laying of coax and placement of radials, and Mike obviously has a deep reservoir of experience and insight as well as the enthusiasm and resolve to tackle any issue. The photos, most taken by XYL Natasha, and commentary demonstrate how well Mike deals with whatever happens.

No presentation by Mike would be complete without trivia or off-the-beaten-track info that is only learned by being there, or knowing someone who has done the traveling. So we benefit from all angles of an IOTA activation, from getting there to setting up to operating and sweeping the pileups and then counting up the Qs, in addition to the sightseeing aspect. Beautiful beaches adjacent to red-rock cliffs. Brightly painted houses and boats, too.

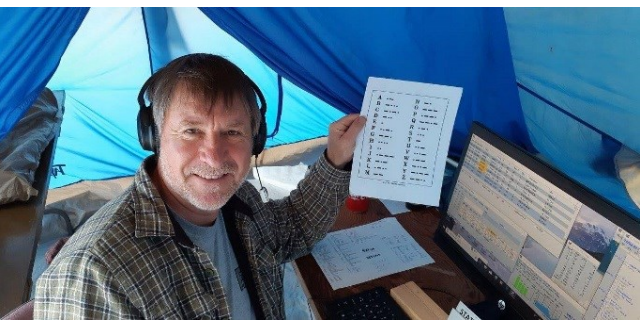
And the next trip? Back out east this summer. And we can't wait to hear the stories and see the pictures.

~ Mike VE7ACN

April 16 - June 23—Russia;

*July 15 ish - September 15 ish
Quebec and New Brunswick IOTA expedition;*

September 20 ish - November 10—Russia.



Radio-Active

John Brodie VA7XB

Profiles of SARC Members



Paul Andreassen VE7NUD

Paul Andreassen was SARC's star pupil in this Spring's basic certification course, achieving an amazing 100% on the exam and becoming one of our newest and most promising members. He has had quite a varied career.

Born in New Westminster, Paul has been a native of the Lower Mainland all his life. While in high school, he worked as a deckhand with his father who was a commercial fisherman, then later took jobs in bottling plants and a sawmill, among other things. After a few years in the workforce, he then decided to return to school and complete his formal education.

In 1975 Paul became a full-time student at Douglas College, followed by a program of science and Information Technology at Simon Fraser University, where he earned a BSc with a Physics major in 1989.

After graduation from SFU, Paul was employed as a formulating chemist by a BC Hydro subsidiary, Powertech, testing paints and coatings of all types for abrasion resistance and durability.

Starting in 2000, worsening arthritis caused Paul to go on permanent disability until his retirement in 2017. Though partially disabled, Paul still maintains an active life as an operator of a bed and breakfast in Panorama Ridge, where he and his wife enjoy meeting visitors from around the world. To supplement this, he operates a commercial photography business specializing in landscapes and ocean photography.

Paul has been a Director of the Scandinavian Business Club and is currently President of that organization. In addition, he is owner of website hosting, design and maintenance provider, Hypersonic Internet Services, specializing in content management systems. He has a special interest in electronic data interfacing (EDI) which involves computer-to-computer communication.

As owner of "Skinnydipper Services Inc" Paul also offers "internet, recreation and event services for the naturist (i.e. 'nudist') world".

Paul's interest in boating harkens back to his days as a commercial fisherman and in this regard he has taught courses and is an examiner for ROCM (Restricted Operator Certificate - Maritime) course, including teaching courses in marine radio communication.

He and his wife, Lauren between them have 4 children, two of which are still in school and the other two are adults living in Alberta. Worldwide travel is one of their most enjoyable luxuries and they have visited many parts of the world including Europe, Australia, New Zealand and Japan. Travels to the UK, Russia and Eastern Europe are in the immediate future.

Technical things such as amateur radio have always interested Paul and, as a newly certified amateur, he hopes to get involved in contesting and field day and earning his advanced certification so that he can assist with instruction of those new to the hobby. Paul is currently involved in working with his Neighbourhood Emergency Preparedness Program (NEPP) to set up a communications strategy for his local area.

Paul, welcome to SARC!

~ John VA7XB



April 2019

Hardware

John Brodie VA7XB

A Vector Network Analyzer



The great thing about amateur construction projects is that it provides opportunities to learn about new things. I was curious about a device called a VNA (Vector Network Analyzer) after Les Tocko VA7OM showed me his home-built VNA which he was using to tune up the triplexer, diplexer and bandpass filters currently under construction. Here is what I learned from a Tektronix website.

Vector Network Analyzers are used to test component specifications and verify design simulations to make sure systems and their components work properly together.

From mobile phone networks, to Wi-Fi networks, to computer networks and the to the cloud, all of the most common technological networks of today were made possible using the Vector Network Analyzer that was first invented over 60 years ago.

R&D engineers and manufacturing test engineers commonly use VNAs at various stages of product development. Component designers need to verify the performance of their components such as amplifiers, filters, antennas, cables, mixers, etc.

How does a VNA work?

A Vector Network Analyzer contains both a source, used to generate a known stimulus signal, and a set of



Shown above: AIM VNA 2180

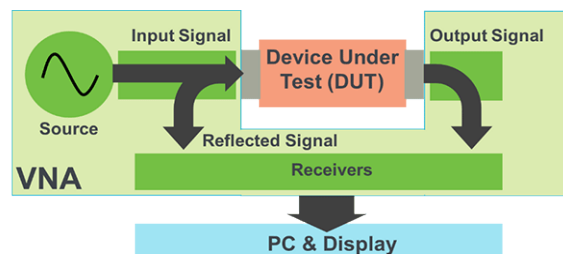
Shown below: Tektronix TTR506A VNA



receivers, used to determine changes to this stimulus caused by the device-under-test or DUT.

The stimulus signal is injected into the DUT and the Vector

Network Analyzer measures both the signal that's reflected from the input side, as well as the signal that passes through to the output side of the DUT. The Vector Network Analyzer receivers measure the resulting signals and compare them to the known stimulus signal. The measured results are then processed by either an internal or external PC and sent to a display.



VNAs perform two types of measurements - transmission and reflection. Transmission measurements pass the Vector Network Analyzer stimulus signal through the device under test, which is then measured by the Vector Network Analyzer receivers on the other side.

Examples of transmission measurements include gain, insertion loss/ phase, electrical length/delay and group delay. Reflection measurements measure the part of the VNA stimulus signal that is incident upon the DUT, but does not pass through it. Instead, the reflection measurement measures the signal that travels back towards the source due to reflections.

It sounds like every serious amateur experimenter should own one of these devices. While most of the available devices are expensive lab quality instruments usable at microwave frequencies, many are affordable and suitable for amateur use at HF.

Next month, we will feature an article describing Les VA7OM's VNA and reflection bridge, and how he used them to tune up the triplexer, diplexer and bandpass filters.

~ John VA7XB



Radio Ramblings

Kevin McQuiggin VE7ZD/K7MCQ

East Coast DXing

This past month I had occasion to visit Halifax, Nova Scotia on a consulting contract. Two partners and I are working to evaluate policing within the Halifax regional municipality. The project is interesting and draws on my previous career as a police officer, so I am happy to be able to help.

As a newly-reactivated ham and former DXer, however, I saw the trip as an opportunity to “activate” in a new location (grid square FN84) and see what the bands look like from the other side of our continent. I packed my Elecraft KX3, a spare lithium-iron (not lithium-ion) 6Ah battery, mic, CW key, associated cabling, and a portable longwire antenna (the popular “PackTenna”) into a small camera bag with a convenient shoulder strap. The only item that did not fit into the camera bag was 25 feet of RG8X, which I packed into my single checked bag.

My planned operation was to be on FT8, and I wanted to see if I could add to my “worked countries” list.

Airport Blues

At the airport, I wondered if I would have any difficulty getting my radio (and the battery) through the ever-vigilant CATSA screening line. I did not want to send the radio as checked baggage due to its value and risk of damage or theft.

I had never travelled by air with amateur radio gear before. Bad thoughts ran through my mind: it was a “transmitter” -

would this be a point of friction or even illegality? Would the large lithium-iron battery be mis-understood as lithium-ion by security staff and subject to scrutiny?

I had done research, and everything appeared legal and within air transport regulations, but one never knows what can happen in practise at an airport. I gritted my teeth and headed toward the departure gates.

The screening line was full, and when I made it to the front of the line I performed the usual ritual: pockets emptied, coat off, boarding pass visible, laptop removed from my carry-on. With some trepidation I placed the camera bag holding my KX3 into one of the big screening bins. To ward off any bad karma which might have been lurking, and possibly even the imagined emergency response team, I smiled at the very serious looking CATSA lady and said, “there’s a shortwave radio in the bag, it might look unusual in the scanner”. I dared not say “transmitter”!

My full disclosure complete, I completed the screening ritual by crossing through the “pillars of freedom” body scanner, got blessed by the official handheld wand, and went to claim my belongings. “Got my coat, the spare change, cellphone, my passport and laptop, the critical boarding pass. Hey? Where is my radio?”

I nervously glanced back along the screening line, trying not to draw too much attention to myself. Something was

”

*...one never knows
what can happen in
practise at an airport.
I gritted my teeth
and headed toward
the departure gates.*

April 2019

wrong. The moving belt presenting travelers' belongings to the X-ray scanner was slewing

back and forth;

back and forth;

back and forth,

as the apparently-teenaged CATSA officer was squinting at the scanner's screen, gesticulating, and calling over his supervisor. The serious CATSA lady went to his side and looked even more concerned.

With horror I saw that the bin being scrutinized was the one that contained my radio! My mind raced, and I braced for the arrival of the RCMP's emergency response team and my "Code V" takedown. O, the humanity!

Then the gate diverting potential contraband to secondary inspection snapped open with a loud thud, and my camera bag was routed to purgatory. I would have to explain myself. At least the stern-looking CATSA lady remained on the other side of the screening line.

Honesty is my nature, so when the middle-aged CATSA officer in the secondary inspection area grabbed my camera bag from the bin, smiled and said a happy "good morning!", the pressure was too much. It was time to confess.

"What's in the bag?" he inquired, using a phrase that I had employed for decades myself in a previous career.

I crumbled. "I'm a ham radio operator", I said. "I'm on a business trip but thought I'd bring my radio along and operate from the hotel". I waited. No Code V takedown. He seemed curious. A pleasant conversation about amateur radio ensued, and he told me that their only concern was the large object that turned out, on his inspection, to be the spare battery for the radio. No further issues. I was free to go.

The Journey

It was a very long day with several flight delays in Vancouver and Toronto, terrible winter weather back east, and an

impromptu sleep-over on a concrete bench at Montreal's Trudeau airport.

Halifax airport had been closed by a blizzard.

Not much is open at 0200 hrs at Trudeau airport. Nothing, in fact. The bench was lumpy and uncomfortable due to those little bumps they put on the edges to deter rogue skateboarders, so I had to move on. I manhandled my luggage around the terminal looking for respite. No luck. Hundreds of other delayed passengers had seemingly claimed all of the "better" spots.



Fortune favoured the tired ham, though, and at about 3 AM I was able to slink quietly into the seating area of a closed chicken and poutine fast food place where I had, at least, a chair and a table to sit at.

"Bienvenue!", exclaimed the large cartoon "poulet" on the sign. Mon Dieu! I was grateful to get off of the bench!

I considered setting up the radio and trying for a few QSOs, but given the airport environment and the need for interference-free communications for aircraft, I decided against this.

The night passed slowly, but fortunately the blizzard in Halifax weakened, so I was able to continue my journey from Montreal the next morning. I arrived in Halifax all-but-refreshed, but determined to get the KX3 set up so that I could get on the bands that afternoon, as the day's meetings had been cancelled due to my late arrival.

The QTH

My consulting group usually books nice hotels for our onsite visits, and this trip was no exception. My room was on the top floor of a vintage old railway hotel near Dalhousie University. Furthermore, our rooms were harbourside: looking out over Halifax harbour, and essentially the Atlantic Ocean to the east. Next stop for radio waves: Europe and Africa! I was optimistic of propagation.



"What's in the bag?" he inquired, using a phrase that I had employed for decades myself in a previous career.

I crumbled. "I'm a ham radio operator", I said.

I got the rig out and completed setup and configuration. Next was the question of the antenna.

On a previous driving trip to Oregon, I had had to deploy the “PackTenna” within my (small) hotel room. That didn’t work out too well as the ~20 metres of wire weaved back and forth within the hotel room like a large spiderweb. I got a mild RF burn when my bald scalp touched the wire during a packet transmission. The setup worked terribly and my only QSO was with a ham about 100 miles away, at ~20dB signal levels at that.

I inspected the new hotel room’s window and discovered with delight that it did open, and that the window screen (which was installed in a plastic bracket on the inner side of the window) was flexible enough to be pulled back and allow the antenna wire to be dropped outside. I uncoiled the PackTenna and dropped the 20 metres of wire out the window. I removed the small weight that I had put on the end of the wire to avoid bothering other guests, should the weighted wire blow around and the weight tap the windows of hotel guests on the lower floors. This was to prove a very smart decision!

I hooked up the antenna to my KX3 via the length of RG8X that I had bundled in my suitcase. The rig’s auto tuner easily matched the antenna with 1.1:1 SWR, and I was on the air! I had decided to start on 20 metres as it was mid-afternoon and I thought the band might be open.

First Impression

My focus since returning to ham radio last year has been on digital modes, and in particular FT8. I fired up WSJT-X, set the band to 20 metres, and was blown away by the sight of over 20 DX stations in the very first decoded data frame. For FT8 users, we see “new DXCC entities” highlighted in purple by the software. Here, the entire decoded frame was purple!

Countries (DXCC entities) spotted in the first minutes of operation included most

of the European nations, a couple of middle eastern nations (e.g. Oman), and one in Africa (Gabon). In short order I worked Germany, Italy, Hungary, and Greece. Next were Austria, more Italians, and then Switzerland. My power output was 3 watts and I received decent signal reports (averaging about -12 dB).

While I saw a few US stations and a couple of VEs on the waterfall, the majority of the FT8 bandwidth was populated by DX. Interesting was the complete absence of JAs, one of the most common DX locales we see on the west coast. I suppose that this is due to distance, and hence a logical occurrence, but it was amazing to see the volume of our JA “cadre” in the waterfall replaced entirely by EU stations. JAs likely work EU stations on a westerly path.

I had to go and meet my work colleagues, so that was it for the first day, but I looked forward to further operating during the week.

The Ice Storm

On Wednesday, my meetings finished, I returned to the hotel room with anticipation of working some more of the DX I had seen previously on 20 metres. The weather in Halifax had been brutal, with a temperature drop to -13 C on Tuesday, followed by a rapid rise to above zero, then another dip below zero just as moderate rain started to fall.

Freezing rain pelted down. It stuck to everything in sight. See Photos 1 and 2 to see what the hotel room window looked like. My antenna became a 60-foot long icicle with the weight of likely a kilogram. I noted that the ice coating the wire was becoming thicker the longer the storm continued.

I was concerned that if I tried to retrieve the antenna that it would break, sending an icy “Spear of Destiny” into anything below, so I decided that it was probably better to leave it in place.



Photos 1 and 2: Ice Coats the Windows and My Antenna



April 2019

Being a ham, above all, I continued operating, curious as to how badly the iced-up antenna would affect my signals.

Then, to my horror, the wind started coming up. Not a “West Coast” wind, but one of the legendary “Sou’wester” winds of the Atlantic coast. The hotel building shook and I was sure that I could feel it swaying back and forth. My antenna convulsed in the wind and started banging the side of the hotel. I feared broken windows on the floors below. Good thing I had removed the weight at the end of the antenna!



The wind whipped the antenna around like, well, a piece of wire that had been left out in the wind to be coated by $\frac{1}{2}$ inch of freezing rain, and it started rotating three hundred and sixty degrees in the wind surges, like an icy propeller around the feed point. I was worried that the wire would break, but it was an intriguing spectacle to watch!

Stay calm, I thought to myself. I hadn’t actually seen any windows get broken, and there were no audible screams from below. The conditions were hardly supportive of opening the window and dragging a 60-foot ice spear back into the hotel room, so I had to “ride it out”. I continued to call that station in the Balearic Islands (EA6) that had been eluding my entreaties.

My polarization was vertical one second, horizontal the next, and I observed signals on the FT8 waterfall come and go as the wind whipped the antenna around and around. Technically, it was quite interesting.

I made a few nice DX QSOs, and after about an hour the wind died down. The warm front had advanced and the ice on the windows and on my antenna began to melt. I drew the antenna back into my room and was able to break off the remaining ice quite easily.

I had weathered the storm.

The Rest of the Week

I was able to get on the air most nights after the work day had finished. Generally, I would operate from about 1630 hrs local to 1900 hrs, and then from about 2100 to 2300. I also got up early a couple of mornings and was on the air from about 0500 through 0600. The “PackTenna” would tune up reasonably on most bands, so I tried everything from 160 through 15 metres.

I noted that propagation on 20m seemed to “hang on” much later in the afternoon and evening than it does on the west coast. 20 metres was the best band and I could work DX well into the evening. I would switch to 40 and then 80 metres by about 2200 hrs. In the early morning I operated on 40 and 80.

In regard to the EU stations, Spanish and Italian calls were quite prevalent, and sometimes there would be six or seven of them in the FT8 waterfall at once. As described above, my first contact was Germany, and through the week I worked a couple of “rare ones”, for me at least: Scotland (a fellow way up north in a rare grid), and Wales. Eastern Europe is also prevalent: I worked hams in “European Russia” (as opposed to the fairly common “Asiatic Russia” we can hear here on the west coast quite easily), Bosnia-Herzegovina, and Greece. Turkey slipped through the cracks as we could not complete the QSO due to degrading propagation. I got the Canary Islands, and the Azores. And yes, during the ice storm I did manage to bag the Balearic Islands!

I also heard a number of US and Canadian stations, and they mostly kept themselves busy working DX rather than QSOing one another. I did not work a single US or Canadian station during the entire week. I thought that I can work US stations anytime from home, so I should make the most of my temporary QTH. As noted above, I only heard one JA station.

All in all, it was an exciting way to pass the time during my working downtime on the business trip!

Net Results and Final Impressions

The trip home was uneventful, and I was prepared to open my camera bag to allow CATSA to inspect the radio. I got diverted to secondary inspection, and again the concern was the lithium-iron spare battery. I think that the brick-like mass likely shows up well on the scanner, and security staff are making a good decision in sending me to secondary. It's a necessary step given the importance of airline safety. The CATSA officers were all courteous, professional and treated me well.

I would highly recommend travelling with a portable transceiver and operating while on business trips. Amateur radio provides a great diversion from the working day (and the obligatory dinners, et cetera). Personally, I would rather skip the social obligations and just head for the rig after work!

That's it for this month! Feedback can be directed to the Editor, or directly to me at mcquiggi@sfu.ca. Have a great month and 73,

~ Kevin VE7ZD/K7MCQ

Industry Canada

Update



Innovation, Science and Economic Development Canada Responds to Petition About Interference

2019-03-19 BY ALAN GRIFFIN

On June 6, 2018, Martin Bérubé of Louiseville, Quebec initiated a petition involving a radio station that was “generating interference on purpose”.

The petition attracted 1,135 signatures and was presented to the House of Commons on January 30, 2019. The Government of Canada tabled the following response on March 18, 2019.

“Innovation, Science and Economic Development Canada (ISED) was informed of the individual's conduct in December 2015 by a group of Amateur Radio operators from Quebec. The individual was operating an Amateur Radio station without proper authorization and was known to insult, threaten and impersonate other Amateur operators.

As the individual disregarded ISED's written and verbal warnings, the department took action to enforce the Act.

Due to repeated offences, ISED carried out three searches of the individual's residences and issued seven notices of violation totaling \$2,500 plus fees.

On October 17, 2018, the individual was found guilty of these seven violations of subsection 4(1) of the Radiocommunication Act, pursuant to subsection 10(1) of the Act, by Justice of the Peace Annie Vanasse at the Trois-Rivières Courthouse.

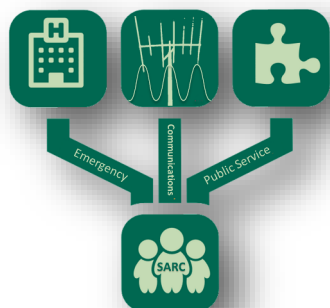
ISED also called upon a federal prosecutor to obtain an injunction against the individual. This injunction is currently at the interlocutory stage. ISED understands that the individual has not been heard on Amateur Radio since August 8, 2018. ISED is closely following this case.”

The text of the petition and the Government Response can be found at the following link:

<https://petitions.ourcommons.ca/en/Petition/Details?Petition=e-1631>

April 2019

Amateur Radio Public Service



Public Service

Amateur Radio Serving The City Of Surrey

What does an Amateur Radio Volunteers Activation look like?

Public Service Report

Don Hamilton VA7GL



We have been discussing the need for the structure for the SARC Public service/emergency group. I would like switch gears and discuss what we could be doing to assist the Surrey community during an event.

So, let's look at what other ham groups are doing. I don't think we want to look at the distant past. Because so much, in ham radio, changes so quickly. The major source for Ham Public Service/Emergency Communications is the ARRL, (America Radio Relay League). Several preeminent programs are administered by the ARRL; therefore, their newsletter is electronically published every week to try to keep ham's up to date with the latest development in ham radio public service activity.

The following is an executive summary of one the California wild fire activations. This includes some background information of the group and their activities.

Amateur Radio volunteers with the Sonoma County, California, Auxiliary Communications Service (ACS <http://sonoma-county-acs.org/>) rallied to assist the Sonoma County Fire and Emergency Services Department in February after

heavy rain led to flooding in the region. San Francisco Section Manager Bill Hillendahl, KH6GJV, told ARRL that while no actual communication emergencies occurred during the weather event, Sonoma County ACS volunteers provided "needed eyes" and were available in case further assistance was needed. Sonoma County ACS Radio Officer Dan Ethen, WA6CRB, said heavy rainfall on fire-scarred areas resulted in flooding along the Russian River.

Ethen reported, "On February 13 and 14, ACS volunteers staffed the Sonoma County Operational Area Emergency Operation Center. Mobile ACS Field Units were assigned to patrol the burn-scar areas that were a result of the Complex Fire Storm in October of 2017."

"All-Hazard Road Patrols observed and reported downed power lines and trees, mud[slides] and landslides impacting traffic flow, and debris issues that posed problems with water drainage and road flooding," Ethen said.

From February 26 - 28, ACS Volunteers staffed the Sonoma County Operational Area Emergency Operations Center (EOC) and the Graton Fire Incident Command





Post (ICP). They provided back-up communication capability between the EOC and ICP to support the evacuation of residents in the Russian River flood area.



ACS volunteers continued All-Hazard Road Patrols while operating on the county-wide 2-meter repeater system. "Mobile patrol units were also tracked on APRS and visible to the EOC radio operators to ensure safety and accurate location reporting of any observed hazards," Ethen said.



"ACS volunteers remain ready to serve their

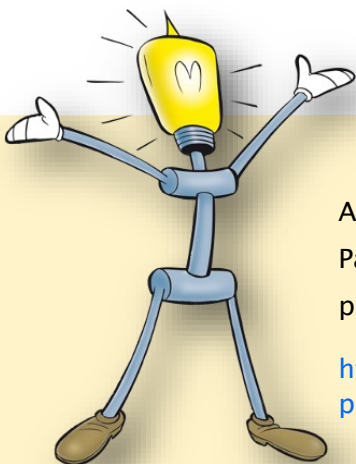
communities," Ethen said. Read more <http://www.arrl.org/news/amateur-radio-volunteers-activate-following-california-flooding>.

I hope this gives you a snapshot of what others are doing to help keep their communities a better place to live.

Hopefully this will motivate you to sign up for the SARC public service group. See you at the next meeting to answer any questions.

Source: Excerpts taken from *The ARRL Letter* on March 14, 2019

~ Don VA7GL



A new podcast for ham radio newcomers is now available. 'The New Ham Radio Starter Pack' is the focus of the new (March 21) episode of the 'So Now What?' biweekly podcast for Amateur Radio newcomers. Check

<http://www.southgatearc.org/news/2019/march/new-edition-of-ham-radio-newcomers-podcast.htm#.XKBADKR7mUk>

Name	Frequency	Offset	CTCSS
VE7RSC (Primary Repeater)	147.360	+0.600	110.9
VE7RSC (Secondary Repeater)	443.775	+5.0	110.9
VE7RPT (Primary Regional Repeater)	146.940	-0.600	
Optional	136.5 Rcv		
Simplex 1	(VHF)	146.550	
Simplex 2	(VHF)	147.420	
Simplex 3	(UHF)	446.550	
Simplex 4	(UHF)	447.425	

Other frequencies in the Greater Vancouver area:

Primary: Coquitlam/Abbotsford 146.430

Primary: Inter-Municipal Group 3 146.445

Primary: Vancouver; Mission; Sec. Coquitlam 146.460

Primary: Kent-Mission; Sec. Richmond 146.475

Primary: Inter-Municipal Group 2 146.490

Primary: New West; Sec. Richmond 146.505

National Calling / FM Simplex Group I 146.520

Primary: North Shore; Port Coquitlam 146.535

Primary: Bowen Island; Surrey 146.550

Intermunicipal Group 1 Coordination 146.565

Primary: Lions Bay/Vancouver/Delta/Langley 146.580

Primary: Port Moody; Sec. Burnaby 146.595

Secondary: Vancouver/Surrey 147.420

Secondary: Vancouver (UBC) / Maple Ridge 147.450

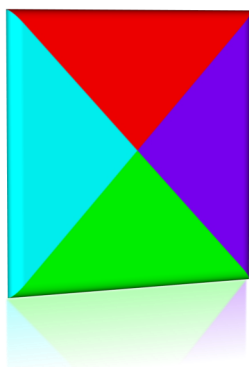
Primary: White Rock/Chilliwack; Sec. No. Shore 147.480

Secondary: Burnaby/Pitt Meadows 147.510

Primary: Delta; Sec. Abbotsford 147.540

Primary: Hope; Sec. Delta; ALSO EMBC 147.570

April 2019



Foundations Of Amateur Radio

VK6FLAB Onno Benschop

Episode 197—What's In A Chirp?



*For the audio
podcast
Foundations of
Amateur Radio
visit the website:
[http://podcasts.itmaze.
com.au/](http://podcasts.itmaze.com.au/)*

On Thursday the 3rd of July 2008 at 6 minutes to 7 at night a developer called Dan KK7DS started to scratch an itch and published the results. The next morning before breakfast Dan added more. Since then about a hundred people from around the globe have contributed to that project.

Some people made little changes, others made large contributions over many years. In all, on average, the project saw a change every 29 hours over more than a decade of contributions.

On the 16th of July, less than two weeks into the project, it got a name, **CHIRP**. It's been translated from US English to Spanish, French, Hungarian, Italian, Dutch, Polish, Brazilian Portuguese, Russian and the Queens English.

From the beginning of talking to a single Icom IC-92 radio, CHIRP today supports 27 different Icom radios, 36 different brands of radio, hundreds of different radios in all, with new ones being added every couple of months or so.

The software runs on anything that will run Python, that includes Windows, OS X and Linux and it does it with an extremely modest footprint and it's free, free in cost and free as in Open Source.

If you're not familiar with CHIRP and you have a radio, then it's time to get to know this tool. It makes it simple to program your radio, to configure settings and to make backups of your current channel listings. I should mention that this is not just for hand held radios, there are plenty of HF base station radios supported.

When you run CHIRP it presents you with a window where you have a spreadsheet view of the channels in your radio. You can download the channels from your radio or upload new ones. Changing a frequency is as simple as clicking on the frequency and typing a new one, with a full-human-sized keyboard, rather than the poor excuse for a dial-pad your radio has. If your radio supports it, you can supply a human readable name, configure offsets, CTCSS and tuning step size, the mode and several other properties.

If you're unsure where to get started, CHIRP even comes with a list of frequencies to get you on your way.

You can create different configurations for different types of operations. For example, if you're into SOTA, you can make a configuration file that has all the relevant SOTA frequencies, but when you head back home and want to use the local repeater network, you can build a set for that. If you visit a different state, another country, or if you want to copy your channels from one radio to another, you can with CHIRP.

If you want to get started, there's a Beginners Guide, a list of frequently asked questions and you'll find information about what cables to use, specific errors and issues you might encounter and if you're a software developer, you'll find information on how to contribute.

If you want the ability to program your radio on any computer, you can download a boot-able CD that will run CHIRP without installing it and if you need help,

there's an active mailing list, going back to 2008, an up to date wiki, issue tracker and of course, you can download the source-code, if that's your fancy.

CHIRP makes all that possible because one amateur wanted to scratch an itch.

What's itchy in your life?

~ I'm Onno VK6FLAB



Episode 171: Cloud Warming in style or what is NVIS?

The term NVIS, or Near Vertical Incidence Skywave is in my short experience as an amateur heaped with scorn and ridicule. Terms like cloud-warmer come to mind when people discuss the principles associated with NVIS, but that does happen in the context of where I live, that is, one of the most isolated cities on the planet, Perth in Western Australia.

NVIS has several advantages over other forms of HF communication, it can be done with low power, there is little or no signal fading, simple antennas work well, it has low path loss, better signal to noise ratios and if you're in a valley, you can still use it.

So what exactly is NVIS?

In the past I've talked about long distance HF communication. Your radio signal bounces off the ionosphere, bounces back to earth and so-on. Like skipping a stone on a pond, the angle at which your signal hits the ionosphere determines what happens next. In general, shallow is good, steep is bad, much like the plop you hear when you don't hit the pond just right, a radio signal can go through the ionosphere, never to be heard again.

NVIS is about hitting the ionosphere at a steep angle, in such a way that it reflects back to earth. Without going into detail, generally you can use 40m during the day and 80m at night with some variation depending on the solar cycle and whom you want to talk to.

NVIS gives you communications less than 1000 km away, plenty to talk to everyone in your city and surrounding area. In the case of an

emergency that's also likely enough to get out of any emergency affected area, so plenty of excuses to set up and try for yourself.

I can start talking about angles, maximum usable frequencies and so-on, but I won't. These all relate to specific circumstances, depend on what antenna you're using, what the ground conductivity below you is and as is typical in our hobby, many other variables.

What I can say is that NVIS to NVIS station works best, so if you're going to test this with a friend, it will help if you both set up a similar station while you learn the variation associated with this kind of communications.

Now I did mention up to 1000 km, that isn't enough to leave Western Australia, Perth to the border is about 1500 km, but if you live in the *Netherlands, you can get to 15 or so countries. Depending on where you are, NVIS will give you different outcomes and what I'm talking about affects each station differently.*

For me, the attraction of NVIS is solid communications on 40m and 80m, something that has eluded me so far. It also allows for a low simple wire antenna, an inverted vee dipole, two bits of wire strung up on a pole, 6m in the middle 2.5m at the end will get me up and running. Perfect for a field-day, excellent for a local contest and brilliant if you're only using low power as a beginner.

Because the antenna is close to the ground, it's pretty much omni-directional. If you set-up an antenna for 40m and then cross that with an 80m antenna and feed them both from the same

April 2019

To listen to the podcast, visit the website: <http://podcasts.itmaze.com.au/foundations/> and scroll to the bottom for the latest episode. You can also use your podcast tool of choice and search for my callsign, VK6FLAB.

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>.

Foundations of Amateur Radio Volume 7 is out now - with chapters on digital modes, coax connector loss, waterfalls, station performance and more.

Feel free to get in touch directly via email: onno@itmaze.com.au, or follow on twitter: @vk6flab (<http://twitter.com/vk6flab/>)

If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6.net>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link and 2m FM via various repeaters.

ITmaze -ABN: 56 178 057 063

phone: 04 1219 8888
onno@itmaze.com.au

point, you'll have a configuration that will operate well for 24 hours without needing to move antennas in the dark.

I have no illusions that an NVIS antenna will help me make contact between Perth and Japan, but then it's not intended for that. I've spoken in the

past about finding the right tool for the job. NVIS is a tool, it has a job and it's very good at doing that. It's not for everyone, all the time, but it's a tool that you as an ambitious amateur should know about.

~ I'm Onno VK6FLAB

We have wrapped up another course

We started our latest Basic Amateur Radio Course on January 8th and, with two 'snow day', cancellations, we wrapped up with the exam on March 19th.

Part way through this course we were able to switch to the new Surrey Fire Services Training Centre. This is a state of the art training facility with top notch classrooms, fully equipped for our needs. Our sincere thanks to SFS for their hospitality. We are hopeful that some of our students will join SEPAR given their stated interest in emergency preparedness.

This course was a bit different in that we decided to no longer require purchase of the Basic Study Guide. We have had feedback in several courses that, while informative, the guide delves too far into technical material, overwhelming many students with a non-technical background. We teach to the Canadian Question Bank and cover each of the 1,000 questions at least once over the 21 hours of instruction.

Instead we have produced our own manual distributed in weekly chapters which covers the Question Bank with detailed descriptions on a level that most would understand. Given that most passed with Honours (over 80%) and with the feedback received after this course, we think we're on the right track. The other benefit is that we can charge less for the course as we do not have to include the price of the book.

Congratulations to all our new Amateurs. All have received a year of membership in SARC. We hope to see you at meetings, hear you on the air, and have you become involved in our many events.





No-Ham Recipes

French Onion Soup

The complex flavours and richness of French onion soup belie its simple preparation. Onion soups were popular as far back as Roman times, and were considered a peasant food, mainly because onions were easy to grow and plentiful. The recipe we know today originated in 17th century France, and is as much loved today as it was then.

This recipe makes 1 serving. For 6 servings, use the ingredient quantities to the right.

1 Serving

- 1/2 yellow onion peeled and sliced
- 1 tablespoon (15 ml) butter
- 1 tablespoon (15 ml) dry sherry
- Parmesan or Romano cheese, freshly grated
- 1-1/2 cups (375 ml) beef or chicken stock

6 Servings

- 3 onions, peeled, sliced)
- 1/3 cup or 90 ml butter
- 1/3 cup or 90 ml dry sherry
- 1-1/2 cups or 375 ml
- 9 cups or 2.25 liters

- Salt to taste (Salt as desired)
- 1 baguette French bread, toasted (1 baguette French bread, toasted)

Saute yellow onion in butter until caramelized (until golden or brown). Place 2 tablespoons of the caramelized onions in a 1/2 cup (375 ml) soup bowl, and add dry sherry and grated cheese (try 1/4 cup (65 ml] per bowl). Add the hot beef stock to the bowl, and season with salt. Float a slightly less than 1/2 inch thick (1.3 cm) piece of French bread over the soup, large enough to cover most of the liquid. Cover the bread with Swiss cheese.

Place the entire bowl of soup with bread and cheese topping under the broiler in the oven to melt the Swiss cheese. For a more traditional take on this dish, cover the French bread with Gruyere cheese and melt it under the broiler.

~ *Thelma Tuttle VE3ARG*



QSO Today - Neil King - VA7DX

Neil King, VA7DX, shares his ham radio story that began as a kid when his father introduced him to the Morse code.

Now after almost 40 years, Neil has over 16 DXpeditions under his belt and continues to enjoy traveling and operating CW from some of the most remote locations in the World.

When he is not traveling as an international IT consultant, VA7DX resides in Vancouver, British Columbia, is active in his radio club and club station. We also discuss the BCWARN amateur radio microwave backbone in this QSO Today

[Listen to the podcast](#)

April 2019



KB6NU's Column

Dan Romanchik, KB6NU

Got an indoor antenna? Help me out here.



To be honest, I've never had a lot of luck with indoor antennas.

Yesterday, a reader asked:

I am studying your “No Nonsense” book as I prep for the Technician test. I am also learning CW. I am going to buy a Yaesu FT 450D as my first radio, and I want to use an indoor antenna as my first antenna. What do you recommend for CW?

I replied:

To be honest, I've never had a lot of luck with indoor antennas. Don't let that dissuade you, though. I have worked many hams with indoor antennas. Just recently, for example, I worked a guy who was using a Buddipole inside his apartment.

If you have an attic, you could easily install a dipole up there. The [ARRL web page on indoor antennas](#) notes:

Attics are great locations for indoor antennas. For example, you can install a wire dipole in almost any attic space.

Don't worry if you lack the room to run the dipole in a straight line. Bend the wires as much as necessary to make the dipole fit into the available space.

Ladder-line fed dipoles are ideal for attic use—assuming that you can route

the ladder line to your radio without too much metal contact. In the case of the ladder-line dipole, just make it as long as possible and stuff it into your attic any way you can. Let your antenna tuner worry about getting the best SWR out of this system

There are plenty of remote tuners now, too. You could install a doublet with elements as long as you can make them, connect them directly to the remote tuner, and then run coax to your shack.

I have also worked guys who have used Slinky antennas inside a house. The advantage of using a Slinky is that it is electrically longer than a wire of the same length.

An attached garage might also make a good location for an indoor antenna. VE3SO, who I've worked several times, uses a [magnetic loop antenna installed in his garage](#).

If you do a web search for “indoor amateur radio antennas,” you'll get many more ideas. Here are a few that looked promising to me:

- [Indoor antenna for 7 MHz](#)
- [An Indoor Reduced Size Rectangular Loop](#)

Another option might be to load up your gutters! I've worked a couple of guy who use gutter antennas, including [WA8KOQ](#) and [K3DY](#).



Can the Jetson Nano bring AI to amateur radio?

Arduinos are fun, and Raspberry Pis are cool, and hams have been quick to adopt these platforms and use them in amateur radio applications. The latest small computer—the NVIDIA Jetson Nano—could take this to a whole new level.

The Nano is the newest and the smallest of the NVIDIA Jetson Series of machine learning (ML) enabled computer boards (shown below). It comes in a DIMM package measuring only 70 x 45 mm. Despite the small size, the specs are very impressive:

- 64-bit, quad-core ARM Cortex-A57 CPU complex
- 128-CUDA-core Maxwell GPGPU designed to handle video streams as well as ML chores
- 472 GFLOPS of performance

Performance-wise, NVIDIA has shown that it can process eight 1080p video streams while using deep neural networks to identify objects in each stream. The system can also drive two displays using HDMI 2.0, DisplayPort (DP) 1.2 or eDP 1.4, as well as DSI.

To get started using the Nano, you can purchase the \$99 Jetson Nano Developer Kit. The developer kit includes a Jetson Nano DIMM (without the eMMC storage) and costs only \$99. You must use a MicroSD card with the kit for storage.

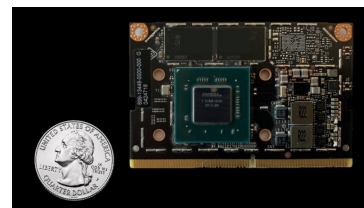
To program the Jetson Nano you use the NVIDIA JetPack, which includes a board support package (BSP), Linux OS, NVIDIA CUDA®, cuDNN, and TensorRT™ software libraries for deep learning, computer vision, GPU computing, multimedia processing, and much more. The software is available using an easy-to-flash SD card image that makes it easy to get started.

NVIDIA Jetson Nano modules will be available from distributors worldwide starting June 2019. The NVIDIA website says that the development kits will be available by the end of March.

But, what can you do with a Jetson Nano? There's an incredible amount of processing power on this board, so the question should be what can't you do? I could see feeding it the I/Q stream from an SDR and decoding CW, phone, and digital signals. Taking that a step further, perhaps it could monitor the bands and alert you when say 6m is open.

~ Dan KB6NU
Reprinted with permission

When he's not trying to figure out which way current flows, Dan blogs about amateur radio at KB6NU.com, teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at cwgeek@kb6nu.com.



You might also have a look at this idea:

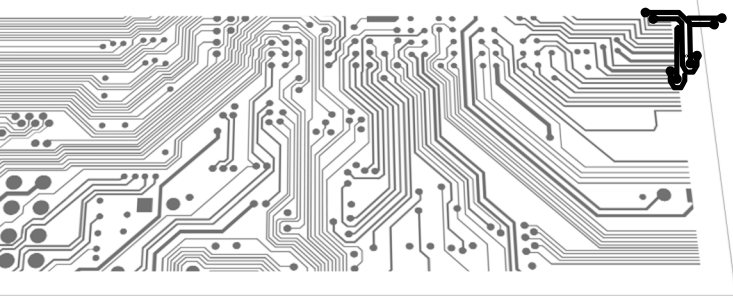
<https://www.amateurradio.com/part-4-lets-look-at-some-condo-antennas/>

March SEA-PAC UPDATE

Registration is open for SEA-PAC, the largest Ham Radio convention in the Pacific Northwest. If you register online or by mail, postmarked by April 15, you will save \$5 and receive a bonus entry in the prize drums, giving you two chances for some really great prizes. Extra prize tickets can be purchased at the convention. Hotels are filling up fast, so make your reservations soon and don't forget to ask for the special SEA-PAC rate. A list of Sponsor Lodging is available on the <https://www.seapac.org> web site.

With your paid admission to SEA-PAC, you can attend any of dozens of seminars related to operating, radio equipment, antennas, digital modes, getting on the air and many other topics. There are sure to be seminars you'll want to attend. A complete list is available on the SEA-PAC web site.

April 2019



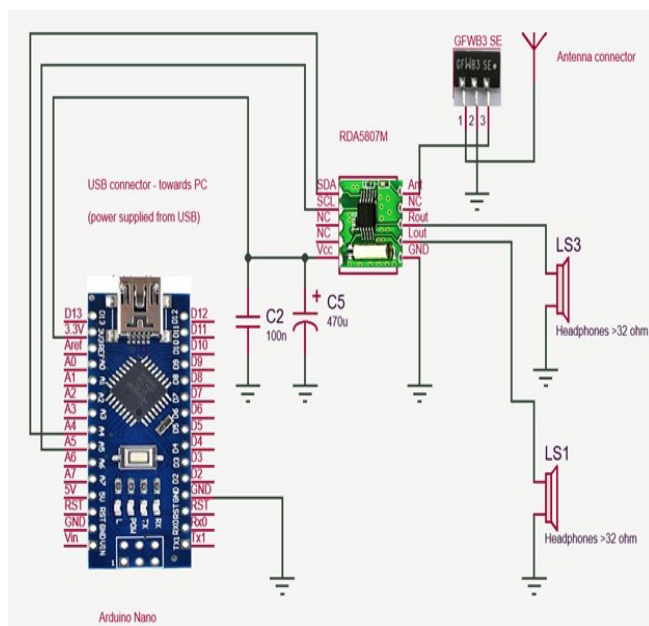
TECH TOPICS

Daniel Romila VE7LCG

FM Stereo Radio With Arduino—Part

- This part 1 is dedicated to making a fully functional FM stereo radio having a dedicated digital radio module controlled by an Arduino Nano board. The volume, frequency, mono/stereo is controlled by a computer, which also displays the frequency, the strength of the signal and whether the station is received as MONO or as STEREO signal
- In the May Communicator, Part 2 of this article will use the hardware from Part 1, and will continue with a second board, for control of the volume and frequency, either by 3 push button switches, or by a rotary switch, and a small OLED display for showing menus, frequency and so on.

The schematics that I made for this part 1 is the following:



On the Internet one can find various versions of the above schematics. I drew the schematics I put together, and I put a second layer on top with the boards that I used, for easier replication by someone else.

Exactly what I did, with the same sketch, but with the Arduino Uno instead of Arduino Nano can be found at:

<http://www.theorycircuit.com/arduino-rda5807m-fm-receiver/>

(The Arduino Nano and Arduino Uno use the same ATMEGA328P microcontroller; they have the same pins - pins with the same names for these schematics, but in a different position and the boards have different sizes.)

The following explanation supposes the reader is familiar with generalities about Arduino, but it is enough to know that an Arduino Nano board is:

- A board containing a microcontroller (a sort of very-very simplified computer);
- Needs communication with a desktop/laptop 'real' computer, in order to both supply power to the board and to teach the board (to program the board) to do something that we want;
- And a bunch of pins where we pass instructions and access the microcontroller to connect to a bunch of peripherals, which can be lights, engines, relays, and in our particular case a digital radio module and a small OLED display (see Part 2 for the OLED display).

On the next page is a picture of the hardware construction.



I used a 4 cm by 6 cm prototyping board on which I soldered the Arduino Nano board. The left black connector is a general stereo headphone jack, but I use it for an antenna input. The upper black connector is indeed for stereo headphones, mandatory with an impedance higher than 32 ohm. I had success with earbuds, but larger, over the head headphones, caused the radio module to stop functioning. I also used amplified computer speakers, and this produced the best result for the tests I did in Part 1 of this article.

I also added some integrated circuits with half of the socket pins connected to appropriate pins on the Arduino Nano board and the RDA5807M radio module. I used them for tests and jump wired them into a breadboard, but I do recommend soldering all connections for everything else that will be permanent.

The 470 microfarad and the 100 nanofarad capacitors from the schematics must be as close as possible to the radio module + and - pins. The module itself has some capacitors, but it is limited and external additional components are recommended. Above right is another view of my board.

In February 2019 you could buy an Arduino Nano board from China for less than C\$3.00 shipping and taxes included.

- I strongly recommend using a full Arduino Nano board and mounting it in a prototyping board as above, and not just an ATMEGA328P microcontroller. If you do use

just a microcontroller in a socket, please be aware that in following this article, you would need to remove and reinstall it at least three times to program it repeatedly. I actually ran tests with over 20 programs (=sketches, using the Arduino language). Please evaluate whether your microcontroller's pins would be OK after this many extractions and insertions. Also an IC socket might not be as safe as soldering. If you buy the microcontroller separately, the power supply connector, the 3.3 V stabilizer and the 5 V stabilizer your cost will be above C\$3.00, and they will never be soldered as robots soldered them on the Arduino Nano board.

- I strongly recommend not to buy a genuine Arduino Nano board, but a clone. In January 2018 the Arduino organization replaced the Arduino Nano bootloader (a small program that teaches the board to talk with a computer) with a faster and better version, which occupies less space. But the company was sloppy and never made this space available to the user (so nothing is gained as memory), and there is a mismatch between the microcontroller and the bootloader. The speed of the communication was dramatically improved in software, but the communication hardware (the FTDI integrated circuit) remained the same, so you can try your luck - or not - with these genuine boards. The Chinese designed clone boards use a faster CH340 USB communication integrated circuit, but never changed the bootloader to the new faster one, and they do not seem to have any intention to do it. Maybe they know something?

The radio module (*lower right*) that I used in my experiments is RDA5807M and



April 2019

in February 2019 it cost C\$0.47, shipping and taxes included. The module is an 11 mm by 11 mm square with 5 soldering pads on one side and another 5 soldering pads on the opposite.

The RDA5807M radio module is based on the RDA5807M integrated circuit. There are other kinds of RDA5807, with other letters after the name. They have different characteristics and different packages. The only external components that I saw on the breakout board are a 32.768 KHz crystal, a capacitor towards the antenna pin, and a decoupling capacitor between the plus and minus pins. Nothing else.

This integrated circuit is described in the datasheet that knows to receive FM stations between 50 MHz and 115 MHz. Unfortunately I tried those limits in the sketch, and they cannot be reached. Every time I write something lower than 87 MHz it accepts the input, but goes in function and displays 87 MHz. Every time I input something higher than 108 MHz it accepts the input, but goes in function and displays 108 MHz. There is nothing further I could do from the sketch I wrote. The program I wrote and uploaded into the board uses predefined radio libraries which force behavior as explained above. Otherwise the radio module would at least be useful in the 50 MHz ham radio band. The sensitivity is better than 1.3 microvolt and I successfully completed mono and stereo tests with a 10 cm antenna. (I bought one thousand 10 cm red plastic wires and one thousand 10 cm black wires from China, so I will be finding uses for them for a while - LOL!)

The integrated chip uses a low intermediate frequency. The minimum step is 25 KHz. It has a stereo decoder and also RDS/RBDS decoder - that means it can display the name of the received station, the song, singer and whatever the station digitally transmits in RDS/RBDS. There are other digital radio modules available, but usually they do not have a RDS/RBDS decoder. More important, this RDA5807M has some features that makes it more desirable than other similar modules including:

- Volume control and mute
- Bass boost

One negative point about this module is that it is power supplied from 3.3 V. The Arduino Nano board (as well as the Arduino Uno board) has a pin supplying 3.3 V. An eventual problem can be

shift logic level converting. I used a logic shifter made by myself, with 2N7000 MOSFET transistors. I used specialized boards, several cents each. I decided to simply connect them to the Arduino board directly, as everyone else did, and the radio module did not die. It works best with no additional hardware/connections in between, as everybody else on the Internet tells you.

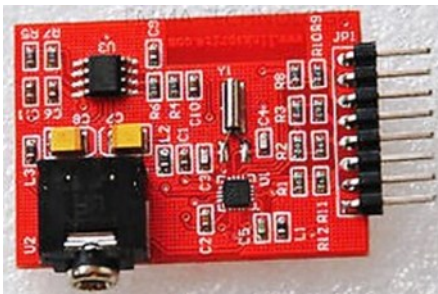
I would like to note here that once the radio module is soldered, that is it. It can be soldered once. I damaged one module because I tried to unsolder it and move it to another project. I had to wait several weeks to get other radio modules from China. In my hardware I put the radio module on top of a rubber piece glued on the prototyping board, and soldered the wires all around into the prototyping board. I cannot stress enough the importance of having everything soldered, and not put in sockets. While the microcontroller does not work at a hundred MHz, this is a radio that works with hundred MHz hardware. Work with it as you would work with a 144 MHz equipment.

There are other popular radio modules, based on the Philips TEA5767 integrated circuit. This is pin by pin compatible with RDA5807M module, but it does not have RDS/RBDS decoder; it does not have any audio amplifier in it, and no digital volume is possible to adjust through the Arduino. The frequency range is smaller, between 76 MHz and 108 MHz. Initially I supposed the 5 V power supply and logic would be an advantage over the RDA5807M, but as I stated above it was not the case in my tests and in the tests of other people who published on the Internet. There are two versions of the TEA5767 module: a small one, with only the radio on it, and a bigger module, with an integrated amplifier based on the TDA1308 chip and with a small telescopic antenna.



I remind you that even the big version does not have digital volume control. You need some potentiometer adjustment inline with the headphones, which is very inconvenient. The small module is around C\$1.00, and the big module is around C\$4.50, both with shipping and taxes included. I ordered a big one but I did not receive it yet, so I cannot compare it with the RDA5807M module. It is declared as less sensitive, around 3 microV instead of 1.3 microV.

Another notable common FM radio board is based on the SI4703 integrated circuit:



The module costs C\$2.52 in February 2019, shipping and taxes included. It works from 76 MHz to 108 MHz. It has volume control and RDS/RBDS decoding. The declared sensitivity is 1.7 microV. It operates from 2.7 V to 5.5 V.

I could not find any radio module that also has medium and/or shortwave capability. There are radio-in-a-chip integrated circuits capable of receiving MW, SW and FM bands, like the SI4735. SparkFun was making such a module (called Arduino shield). The product was retired. What I saw on the module was that the switching from MW to SW was done with a mechanical switch on top of the module, and the switch was lower than other module components, making it very difficult to install in a case.

Between the antenna and the radio module I put a ceramic SAW filter. I did not notice any difference between having it and not having it. I used a 76 MHz - 108 MHz filter because it was what I already had in the house, but 88 MHz - 108 MHz filters are cheaper and in an identical capsule, like BP87108:



20 pieces of these BP87108 filters cost C\$7.93 in February 2019, shipping and taxes included.

But coming back to our radio... after assembling the hardware and doing all the connections, it was high time to teach the newly made board to be a radio. I connected the mini USB connector from the Arduino Nano to a cable and the computer, and I used the free tool provided by www.Arduino.cc called Arduino IDE for programming. Since I did not use either a display or push buttons/rotary switches, the sketch was simple. It can be found at:

<https://github.com/mathertel/Radio/blob/master/examples/TestRDA5807M/TestRDA5807M.ino>

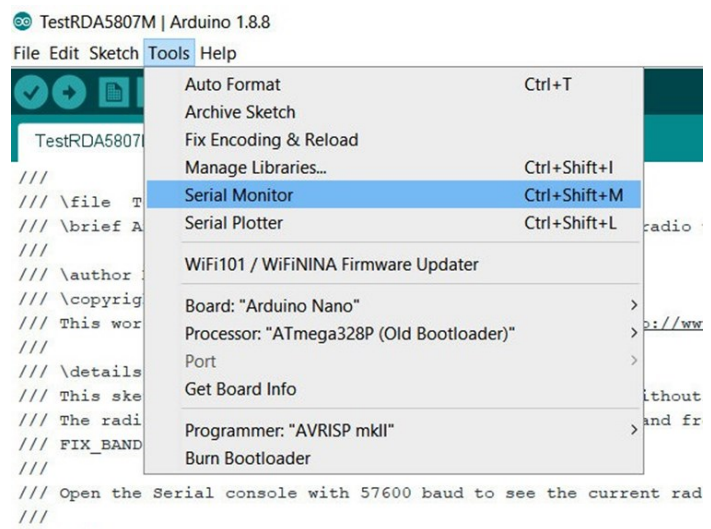
and it was written by Matthias Hertel. In order for the sketch to work it requires previous installation of the radio library into the Arduino IDE. Importing libraries into Arduino IDE is not the subject of this article, but it requires just minutes and it is explained at:

<https://www.arduino.cc/en/guide/libraries>

Please do not forget to choose the right bootloader for your Arduino Nano board. If you use the better Arduino Nano board, the Chinese designed clone, do not forget to select "old bootloader". You also need to have the CH340 driver for the board, available at:

<https://sparks.gogo.co.nz/ch340.html>

Since our Arduino radio does not have its own display yet! (wait for the second part of this article!), it was necessary to open the serial monitor in Arduino IDE:



April 2019

I played with several frequencies. Here is the display for the strong local mono French station:

```
COM5
Audio: -----
Station:104.10 MHz
Radio: --- STEREO RSSI: 24
Audio: -----
Station:104.10 MHz
Radio: --- STEREO RSSI: 24
Audio: -----
Station:104.10 MHz
Radio: --- MONO RSSI: 24
Audio: -----
Station:104.10 MHz
Radio: --- STEREO RSSI: 24
Audio: -----
Station:104.10 MHz
Radio: --- STEREO RSSI: 24
Audio: -----
☒ Autoscroll ☐ Show timestamp
```

And here is the display for a stereo station:

```
COM5
Audio: -----
Station: 97.70 MHz
Radio: --- MONO RSSI: 29
Audio: -----
Station: 97.70 MHz
Radio: --- MONO RSSI: 29
Audio: -----
Station: 97.70 MHz
Radio: --- MONO RSSI: 29
Audio: -----
Station: 97.70 MHz
Radio: RDS --- MONO RSSI: 29
Audio: -----
☒ Autoscroll ☐ Show timestamp
```

Both stations were received in Coquitlam, BC, with a 10 cm wire as antenna. You see above that the stereo decoder had a hesitation and switched for a short time into MONO.

There are plenty of materials on [youtube.com](https://www.youtube.com), and on the Internet in general about radios controlled by Arduino. It was, and it is a very popular subject. For example:

- A very good explanatory video for using a TEA5767 radio module can be found at:

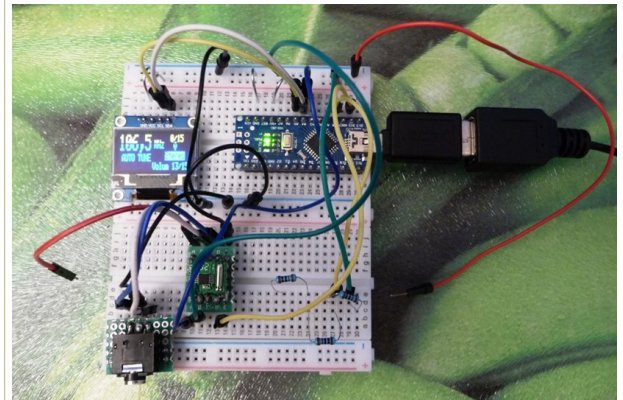
<https://www.youtube.com/watch?v=D7P59X39N9U>

It shows how to use the hardware and the software for doing the 1 station radio.

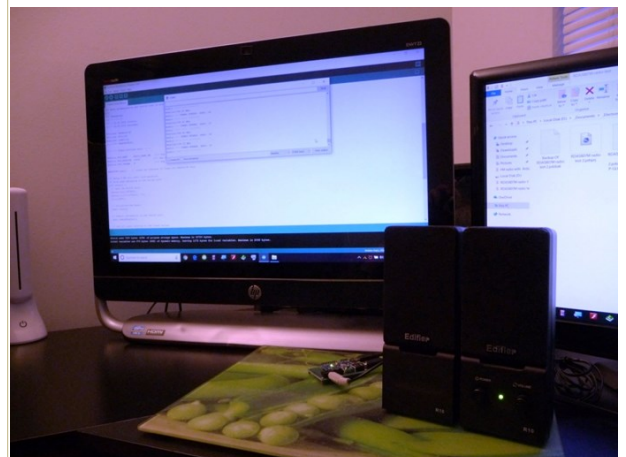
- Exactly the same 1 station radio, but made with the SI4703 radio module can be found in detail at:

<https://www.instructables.com/id/How-to-use-the-Si4703-FM-Radio-board-with-RDS-Ardu/>

We are at the end of part one of this article and I would like to mention that yes, when I started with Arduino controlled radios I jumped directly into having the display and the buttons, to be completely independent of a computer. Here is a glimpse of my breadboard that will be the start of the second part of this article.



It works. It is nothing complicated. I even made a board already with 3 push buttons, amplifier and display on it. I am not happy with the contacts and I was not happy with the base combined Arduino plus radio module board either. So I came back to the simple version first. Yes, the simple version is very “chained” to the computer.

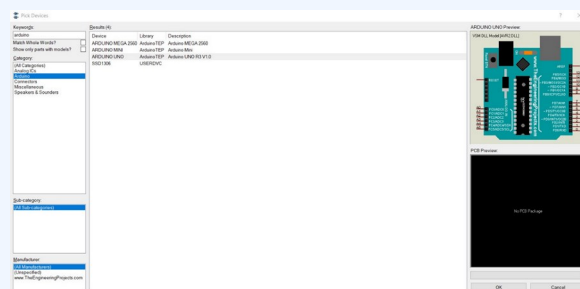


But there was much to learn by experimenting with various frequencies, settings and hardware positioning and soldering.

All those wonderful Arduino radios are possible based on very dedicated people who made their work available for free. With just several Canadian dollars one can make a fully microcontroller radio, program it with the free Arduino IDE and reuse, and reuse, the libraries created by others. In my case this also limited me from using the RDA5807M at 50 MHz, because writing such a library is above my level. I also insisted on the hardware aspect of the Arduino radios because it is neglected almost everywhere on the Internet. It is a radio working in the hundred MHz range, and it does have to be treated as a 144 MHz homebrew is built and treated, which it does not really look like when watching the YouTube videos.

For those with even some adventurous desire in them, I should mention that there are programs that simulate Arduino boards and Arduino peripherals, so nothing needs to be done in hardware anymore LOL! Even

one of the "masters of the electronics engineering" computer assisted design programs (Proteus v8) can place an Arduino Uno board, simulate the code loaded in it, and use the peripherals connected to it like it would do with a transistor.



The second part of this article (in the May Communicator) will be about making a second hardware board, also 4 cm by 6 cm, on which to contain the menu - volume - frequency input/switches and the display. The base combined hardware radio plus Arduino Nano will be used, with a different sketch loaded.

~ 73, Daniel VE7LCC

MORE TECH TOPICS

Daniel Romila VE7LCC

Simulating a CW keyer made with Arduino Nano

This article is a short follow up of the CW keyer presented in the January 2019 edition of "The Communicator," page 36. There I reviewed an Arduino - like board, TTGO Xi and built a CW keyer based on the work of PA3HCM. I was in correspondence with him and he liked my hardware implementation, and added a video on his webpage showing my work. His entire webpage is:

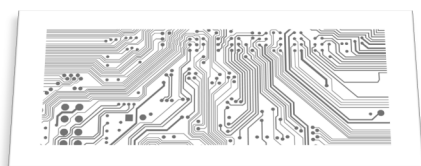
<http://www.pa3hcm.nl/?p=1010>

This article supposes that either you are familiar with computer simulation for electronics or you simply read as information and enjoy to find out what is possible out there.

We can simulate the CW keyer and verify the software and the hardware design without doing anything practically. Powerful simulation programs like Proteus 8 can simulate such an Arduino/microcontroller based keyer without any problem.

I am interested only to see the red LED blink when the DOT or LINE switches are activated. I "installed" an oscilloscope in parallel with the LED. The 10K potentiometer was picked as POT-HG; that means that I can adjust its value during the simulation and see how the results vary (the pot dictates the speed).

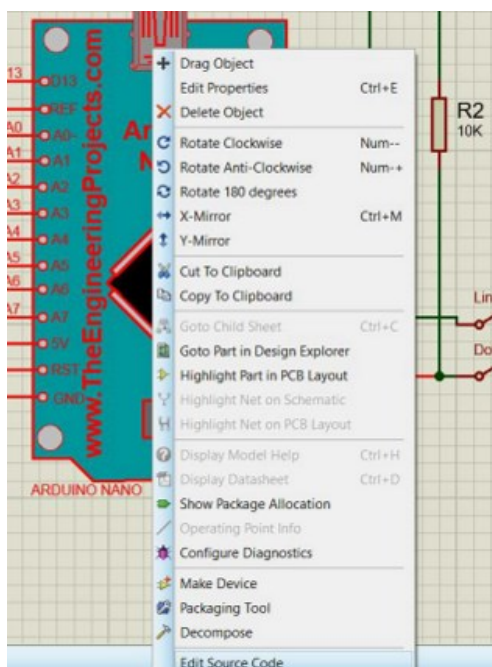
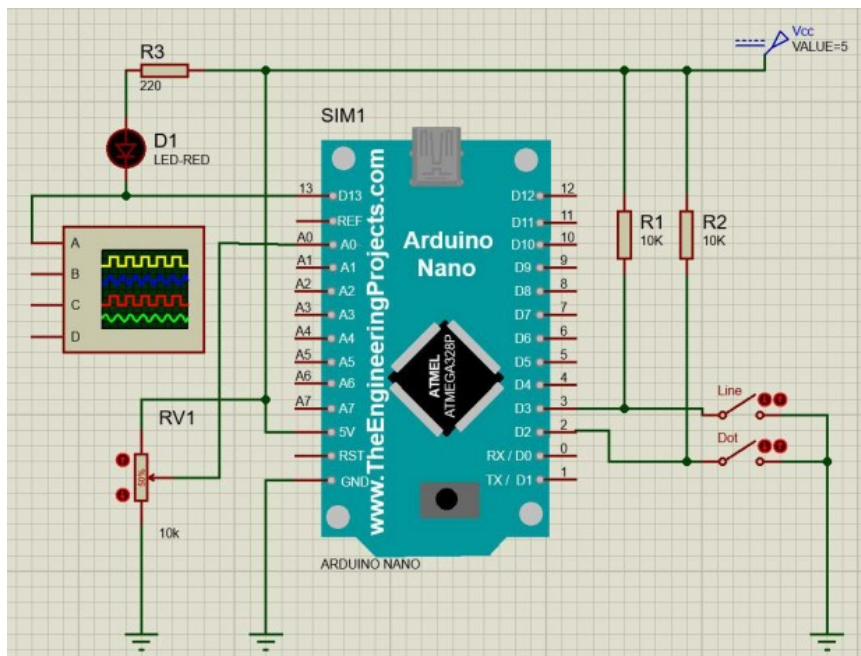
In order to have a nice picture of the Arduino Nano board I used the library from the following website:



April 2019

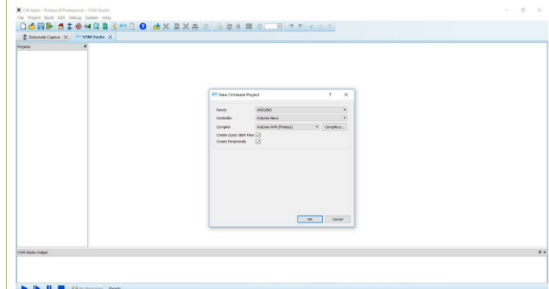
<https://www.theengineeringprojects.com/2015/12/arduino-library-proteus-simulation.html>

They explain there how to download and where to install the library in Proteus. Proteus 8 itself comes with built in Arduino UNO components, just not so nice pictures like the mentioned external library has.



After drawing the schematics as in the above picture it is necessary to load into the Arduino Nano board the program (the sketch, in Arduino terminology). I find that the easiest way for me to do this is to right click the Arduino Nano board and to select from the very bottom "Edit Source Code".

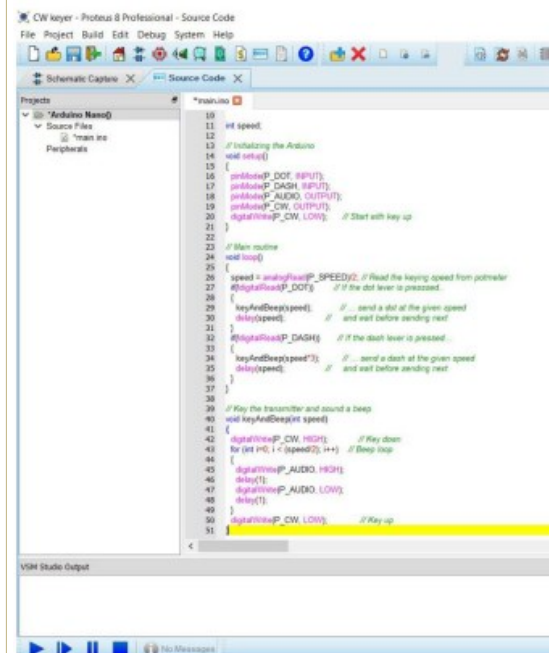
Just accept everything from the new pop-up window:



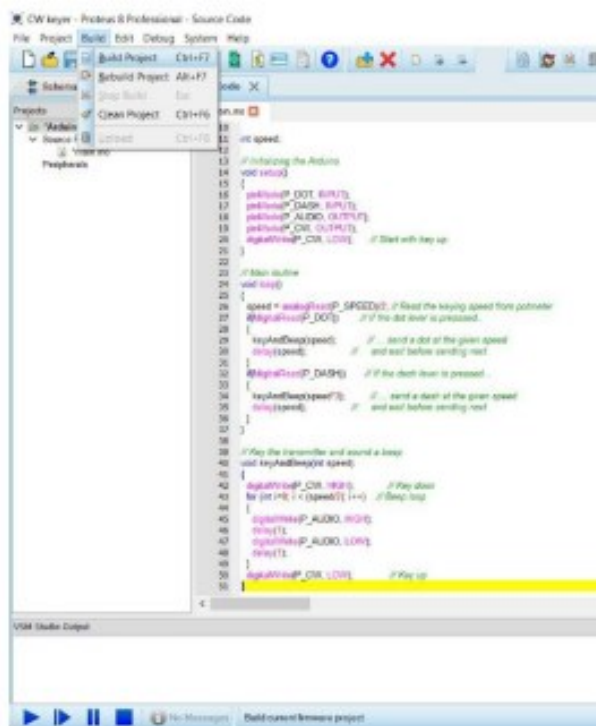
Click OK. Delete absolutely everything that is in the main.ino window (there is a template skeleton) and enter instead the code written by PA3HCM from:

https://github.com/pa3hcm/simple_iambic_keyer/blob/master/simple_iambic_keyer.ino

It is a simple copy and paste operation:



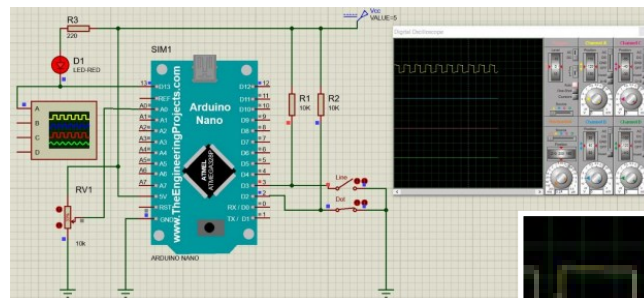
The software becomes useful only if it is verified and compiled by the simulation software Proteus. Click "Build project" - somewhere left, up.



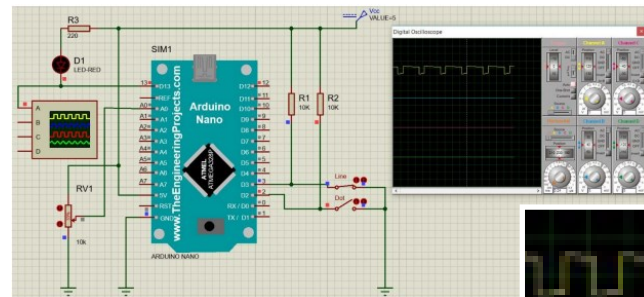
It will take some 8 - 10 seconds and in the bottom window there will be a "Compiled successfully" message:



Now to come back to the schematics and simulate our CW keyer for dits:



And for dahs:



The red LED blinks. The speed can be adjusted with the 10 K potentiometer during the simulation.

I felt the need to quickly write this article because I could not find a computer simulation of a CW keyer made around an Arduino board anywhere on the Internet.

~ Daniel VE7LGG



The finished CW Keyer

Like 'human hair in the ocean': Why ham radio still has an enduring appeal

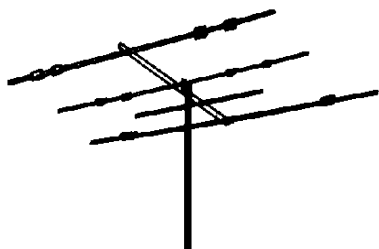
"It's not just a hobby. In a crisis, amateur operators provide a lifeline"

Despite the unusual headline, the CBC has published a story about Amateur Radio in Newfoundland and Labrador.

Even in a world of smartphones, Facebook and texting, ham radio still holds a mystique for many people. More than two million people around the world still use the technology. Of the estimated 40,000 users in Canada, as many as 1,500 live in Newfoundland and Labrador.

<https://www.cbc.ca/news/canada/newfoundland-labrador/amateur-radio-1.4968865>

April 2019



Antenna Adventures 1

Greg Walters KY4GW

A Homebrew 6 meter Yagi And More

Ever since I have gotten on the air since becoming a Ham, I have been fascinated by how easy or difficult antennas can be, in the amateur radio activities. I had made several different wired antennas, mostly inverted vee antennas, and some fan dipole antennas. I enjoy the simplicity of those designs.

I don't have an amplifier, and have felt I would like to make a gain antenna. So I began looking at various designs, and discovered that the Yagi can be fairly simple. Just get those measurements right.

I'm not sure what spurred my desire for a 6 meter beam, other than size, maybe. I think my first bits of material didn't amount to enough to make a 10 meter beam, so a 6 meter would have to suffice.

The start of this project involved deciding where to get my materials. I researched all over the internet and didn't like the cost of either a complete 6 meter beam, nor the cost of materials to make one. I mulled over materials I may have laying around and found an old deep fringe television antenna, long forgotten in the weed near the fence in the back yard.

I went out to the old fence line and sure enough, there was that old antenna. It didn't look promising at first. I carefully coaxed the old antenna from the grip of the weeds. The force was strong with them. I finally got out the main boom of the antenna

with a few elements still attached. Some were firmly attached while others were broken or seriously bent.

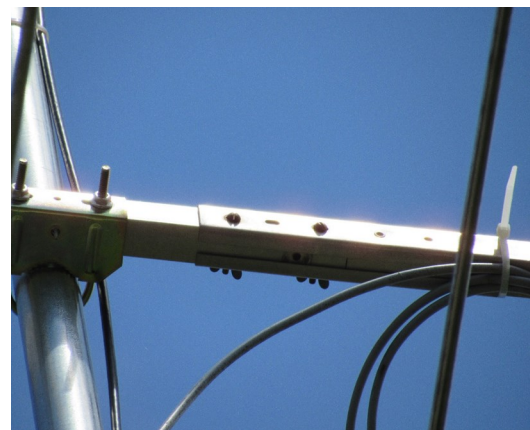
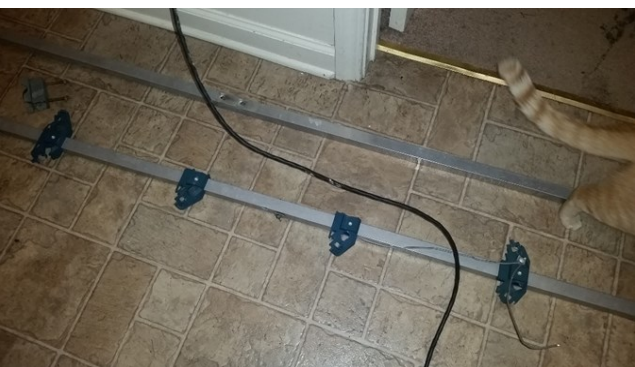
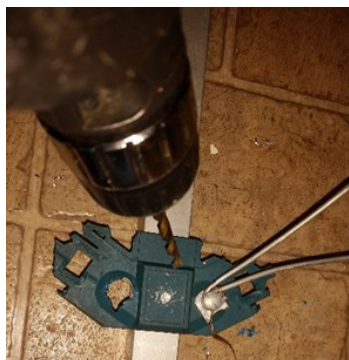
I took what I could and began to cut and drill the old antenna apart.

It really didn't take too long to drill off all the old plastic parts. I was left with a couple of bare booms with which to begin the process of building my 6 meter beam.

The next process, which I don't have a photo of, was simply selecting the best, longest, straightest elements to reuse. That selection was pretty thin and short.

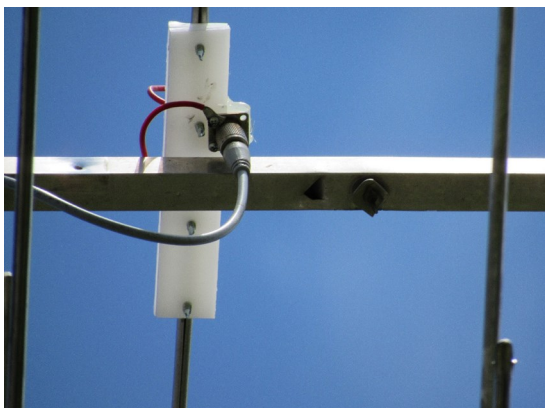
Next I discovered a beam calculator online. This one is from http://www.csgnetwork.com/antennae3y_calc.html I chose 50.1 for the frequency to provide close access to 50.125.

There I had my dimensions. I used those to calculate the total length of the boom that I would need to make this. I simply used the brackets from the old antenna to splice two booms together.



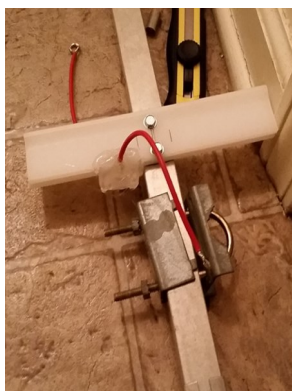
After having a beam of sufficient length, I moved on to the mounts to isolate the elements from the boom. I thought about using wood, but figured it wouldn't last particularly long in the weather. I tossed around other ideas and came to settle on one of those plastic cutting boards. So I went to our local discount store and bought two small plastic cutting boards. Well under \$5.00 for both. I used my table saw to cut up those boards into pieces about 7.5 by 1.5 inches. After that, I measured the center of the newly created beam and located where each of the elements would land. I used hex washer head self-drilling screws to mount the cutting board pieces.

I cut out a radius from the center one which would be the driven element and mounted a panel mount SO-239 to the underside of the cutting board.



You can see the flattened and soldered frayed end of the wire. I drilled a hole through that and used the mounting screw to attach one side of the driven element to the SO239.

On the top side, I made another short piece of wire and soldered that to the center post of the SO-239. The other end of both wires were shaped into a loop, just big enough to wrap around the self-drilling screws and



soldered to hold that shape. After they were attached to the SO-239, I covered the entire feed point in hot glue. I made sure to spread the glue out away from the connector to avoid water standing on it.

Next, it was on to the elements. That was fun.

Since I didn't have any elements close to the right length, I needed to figure a way to splice them. The method I came up with was fairly straightforward, if not slightly challenging.

I cut shorter pieces with mangled ends, on both ends. Then I took the elements that were still viable with factory ends and using regular channel lock pliers, I began to crimp one side of the element where they were originally "cut".

I did this for several inches to assure proper length when finished. When all said and done, I had one piece with its original diameter and one with a reduced diameter.

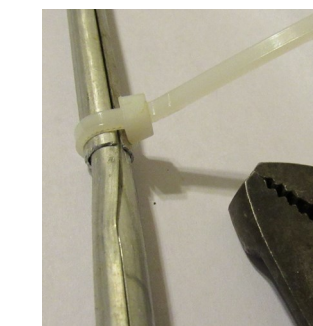
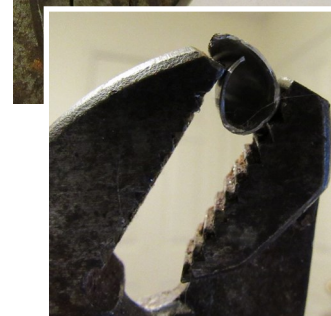
You might notice that crimped tube isn't straight. That's no problem. Even in that condition, I put them together, with a lot of convincing.

Once I was sure of the total length of the element, I placed 2 zip ties, pulled as tight as they would allow, to crimp the two pieces of element together. Once they were together, I simply bent them straight.

Now that I had all of my elements, I simply used those same self-drilling screws to affix the elements to the cutting board pieces. On the driven elements, I used that looped wire under the screw on top of the element on each side. Two screws hold on each element. I made sure to space the screws far enough from each other that there would be no continuity between the beam and elements. You can see the screws protruding on the feed point photo [bottom right].

Once all the elements were attached, it was testing time.

I mounted the antenna on a board on a vertical 2x4 that was clamped to my



April 2019



trailer. Yes, a little bit of redneck engineering. It tuned, but the band was dead.

Still, I was fairly confident it would work, so I mounted it up above my television antenna pointing in the opposite direction. (I'm not sure why.)

Once it was up there, I was very pleased that it would tune from 50.000 to 54.000 at a 1:1 SWR. Now for the waiting game.

Months passed without hearing a soul on the calling

frequency of 50.125. So, I began calling CQ. Months more passed without hearing any other signal. I was beginning to think my antenna didn't work.

But one day, one day, that one magical day... I heard my call come back. It was faint and it was noisy, but there was no doubt it was someone returning my call. I rotated the antenna around to see if I could get a stronger signal. Barely, but yes. I heard his call...WA9ASZ. WooHoo! My antenna worked. That was a tough QSO, but one where he and I exchanged enough, I heard him say "I've got you in the log".



Needless to say, I was ecstatic. Not only a QSO on my homemade beam, but one for the "Magic Band". It was nearly immediately after I lost Steve when I heard a booming signal. I had to spin the beam around and picked up KY4SGM. TWO contacts!! I was already hooked.

Several more weeks had passed with no other voices heard on 6 meters. I played around on CW, which I'm just learning, and made a couple of contacts on there.

Then the weather decided to have some fun. There were a number of particularly windy days. One day I clocked 41.2 mph wind that ended the weather station for the week. Not only that, it somehow broke my reasonably new deep fringe television antenna.



Not only broke the leading element beam down, but put it on the ground, twelve feet away.

Well, that ruined our television reception, but gave me an opportunity...

I knew I was going to replace that television antenna, so, I knew I had some nice long straight elements to play with.

After a few weeks, the new television antenna came in and I was ready to roll. I lowered my antennas and took everything down to the main mast. I had a new television antenna, new rotator, new television preamp and new coax for the television.

My chance had come. The 3 element 6 meter beam was going to get an upgrade. I was pretty excited to have it on the ground.

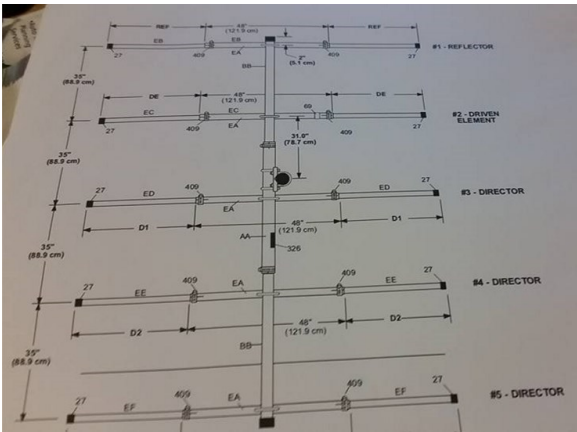
Well, that ruined our television reception, but gave me an opportunity...





I searched all over for a 5 element beam calculator and was never happy with what I found. So I began searching for 5 element beam antennas and came across the Cushcraft A505S. The instruction manual had the dimensions where you could adjust the elements the particular frequency set of your choosing.

Perfect!



I chose the middle, 51.5-53 MHz. Then I worked out the math to find that my current boom length was perfect. I drew my little Yagi on the corner I printed of the measurements. And commenced to making two more elements as described above.

Horizontal Polarization			
	50 MHz-	51.5 MHz-	53 MHz
	51.5 MHz	53 MHz	54 MHz
REF in.	35-1/8 (89.22)	34-1/8 (86.36)	32-1/8 (81.60)
DE in.	31-3/4 (80.64)	28-3/8 (72.07)	26-7/8 (68.26)
D1 in.	29-3/4 (75.56)	27 (68.58)	26-1/4 (66.67)
D2 in.	29-3/4 (75.56)	24-7/8 (63.18)	24-5/8 (62.55)
D3 in.	25-5/8 (65.09)	24-1/2 (62.23)	23-1/2 (59.69)
Set in.	15-5/8 (39.69)	16-1/2 (41.91)	17 (43.18)
X in.	1-7/8 (4.76)	3 (7.62)	3 (7.62)

After that, I took of the original 3 elements and began measuring out from the very end of the beam. I then used those same self-drilling screws to reattach those elements in their new locations.



Continuing, I added the other two elements as before, with plastic cutting board pieces.

So there's 3 directors, one driven, and one reflector element. No time to lose, I had a television antenna, 5 element beam and a dual band vertical for 2/70 back up in the air.

That antenna held up for about 3 years. It faced its demise when I was lowering the mast assembly I had created, and one of the supports gave way. Down to the ground the Yagi, my television antenna and Comet GP-1 fell to the ground from about 4 feet. I was sad, but I had more supplies for a new antenna...



So here we are, in a new place, and I have elements made to length for a new 6 meter Yagi. Another 5 element this time. If the weather would cooperate, I would assemble it and have it ready for when I populate my tower at our new home. That would be a story for another day.

In the meantime, I did use the same process and more broken television antenna elements to make a 2 meter SSB Yagi. It was a little long, so I did the thing you do, and cut it too short. Oh well, more elements wait for my appropriation.



April 2019



I hope to have both antennas and a multiband inverted vee up in the next couple of weeks. I would love to make some contacts with my friends from the north.

Thank you for reading. Feel free to comment, make suggestions, or ask questions.

73,

~ Greg KY4GW

Antenna Adapters for Chinese Portable Transceivers

I get a lot of requests for information about the popular Chinese transceivers, such as the BaoFeng UV-5R. Most of these transceivers use an SMA or Reverse SMA connector instead of the more common BNC or PL-259 connectors. Soldering or crimping SMA cables is a tricky business because of their small size, so an adapter is usually the most economical option. You want an adapter that will not place undue strain on your SMA connector and possibly snap it off or cause damage.

The least expensive local source of adapters I have found is Lee's Electronics at Fraser and King Edward Avenue in Vancouver. Otherwise a good SMA adapter is available on eBay <https://www.ebay.com/itm/1x-UHF-female-SO239-SO-239-jack-to-RP-SMA-male-plug-connector-RF-coaxial-adapter/191947850566?hash=item2cb0fbc346:g:jvcAAOSw9NdXs9dJ> or <https://www.ebay.com/itm/BNC-Jack-to-RP-SMA-Plug-female-pin-straight-Audio-RF-Coaxial-adapter-connector/171340173787?hash=item27e4ab91db:g:6o0AAOSwXvdamKr4>



Richmond Amateur Radio Club SWAP MEET 2019 & EMERGENCY COMMUNICATIONS DISPLAY

Saturday, April 6, 2019 - 10 AM to 1 PM

South Arm United Church
11051 No. 3 Rd., Richmond, BC
(SW corner No. 3 Rd. and Steveston Hwy.)

Admission \$5 - Vendor Table \$20
Door Prizes - RAR Cafe - 50/50 raffle
Free Parking

MAIN DOOR PRIZE
Icom ID-4100A
from Icom Canada

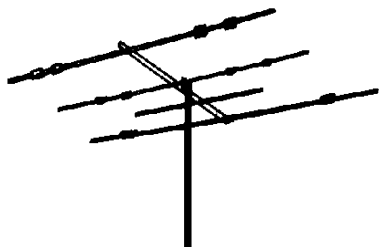
VHF/UHF
D-STAR
GPS



The Richmond Amateur Radio Club (RARC) will be hosting its third annual swap meet and emergency communications display event. There will be the usual vendor tables, door prizes from local and national suppliers, and special raffles (licence pending), as well as a more extensive display of communication equipment by Amateur radio organizations and municipal emergency programs.

Updates on the Richmond Amateur Radio Exhibition & Swap Meet will be posted on this page as they become available:

www.richmondarc.ca/swapmeet2019.html



Antenna Adventures 2

John Schouten VE7TI

A Homebrew 2m and 70cm Roll-up J-Pole

The J-Pole antenna has been around for many years, in one form or another. This version is the perfect antenna for portable use in a hotel room, camping or for emergency use because it has gain, is effective, and takes up little room when packed. Technically, it is a derivative of an end-fed Hertz antenna, which is a voltage fed antenna. Carefully built and properly tuned, it is suitable for both 2-metre and 70cm bands.

Building the antenna is inexpensive and quick and teaches trimming the radiator for minimum SWR, thereby achieving maximum output power. Our Basic course students build this antenna in a workshop to teach them practical antenna theory and allow them to tune for minimum SWR.

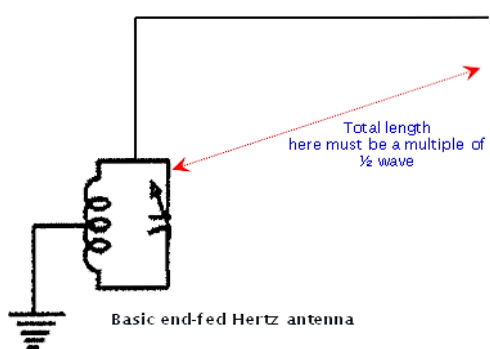
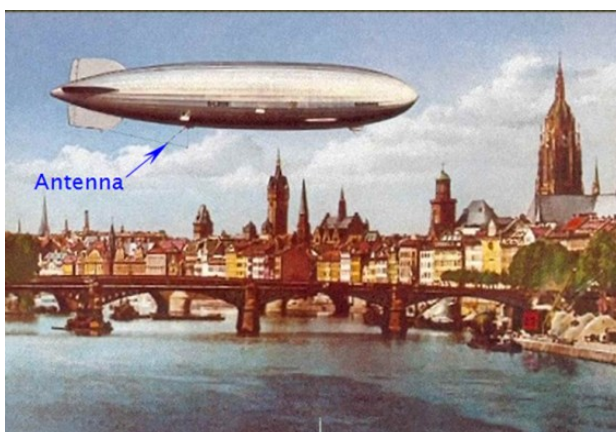
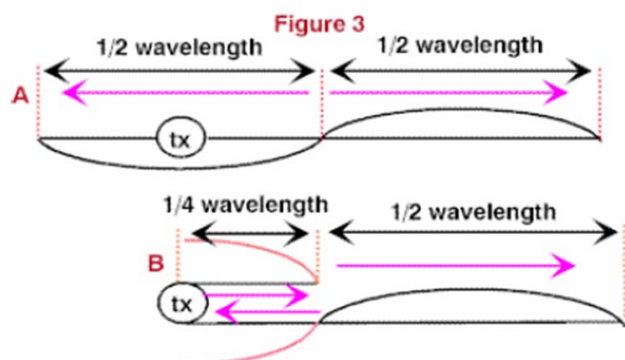


Figure 1 is a version of that antenna. However, there is a derivative of this antenna called the **Zepp**, which is short for Zeppelin antenna. This antenna was used on the famous lighter than air Zeppelin airships of many years ago. The antenna was either used as a trailing wire antenna, where it was allowed to trail the aircraft, being fastened at one end and at the feed point. When the aircraft was coming in for a landing, method had one end of the antenna attached to the lower the antenna was reeled back into the ship. The alternate vertical stabilizer and the other to a folding mast that extended down from the bottom of the radio room cabinet. The picture below shows how this was done.

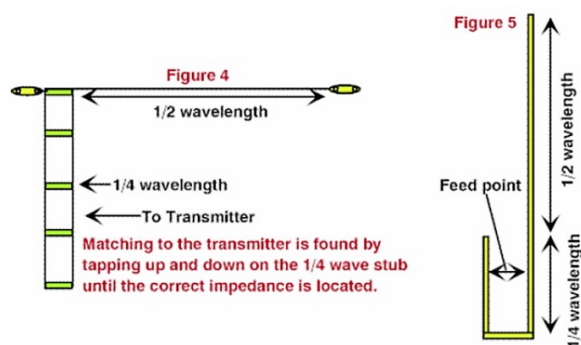
It was desirable to keep the radio room away from the main body and cabins of the Zeppelin due to the explosive nature of the hydrogen gas that was used to supply the lift for the airship. Since the radios of that time had great spark generating capabilities, it was usually isolated from the rest of the airship in a separate cabin. The cabin could only be reached by walking out to the shack via an open catwalk, which was a thrill in bad weather at normal flying altitude. The antenna was also kept as far away as it could be from the airship. Above is a figure of a helium filled airship, which is non-explosive, so the radio shack was combined with the rest of the airship.



April 2019



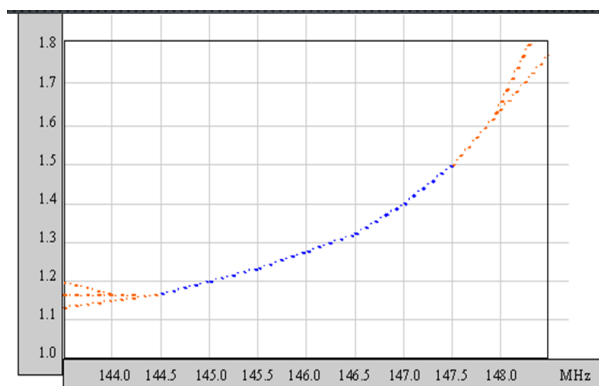
The figure above shows how the original antenna on the Zeppelin was fed. The bottom graphic is of the antenna with the feed point represented by the transmit point on the antenna.



Note that it is fed at a current maximum, or at the center of a half wave portion of the antenna. In this case, the antenna is one full wavelength long. is no counteracting field present to keep it from radiating. The current flowing in the antenna is represented by the light purple lines.

Now if you take the $\frac{1}{4}$ wave antenna element to the left of the transmit input and fold it around to parallel the other $\frac{1}{4}$ wave element, the current flow as illustrated in Figure 3B, will be out of phase with the current in the other $\frac{1}{4}$ wavelength section. This will effectively keep these sections from radiating. The remaining $\frac{1}{2}$ wave section will radiate very well since there is no counteracting field present to keep it from radiating.

On the left is a better illustration of this. In this diagram, the transmitter impedance is matched by tapping up and down on the $\frac{1}{4}$ wave stub until the correct impedance is found, matching the transmitter. This antenna works extremely well on the 2m band, but it also performs within acceptable specs on the 70cm band.

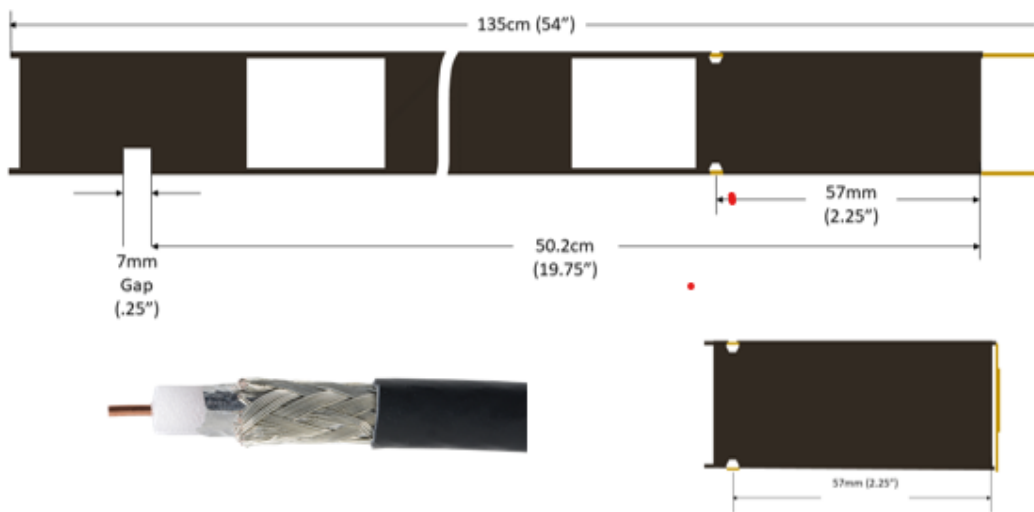


also known as the 'copper' cactus

OK, now let's build one! Be careful... accuracy in measurement is the most important thing here. You will need:

- 54 inches of 450 Ω ladder line (or 22 inches of ladder line and 36 inches of lamp cord or heavy speaker wire for an even lighter antenna)

- 50 Ω coax cable at least 3 feet long
- Heat shrinkable tubing or black tape
- A couple of wire ties or 'zap' straps
- Solder
- Hand tools

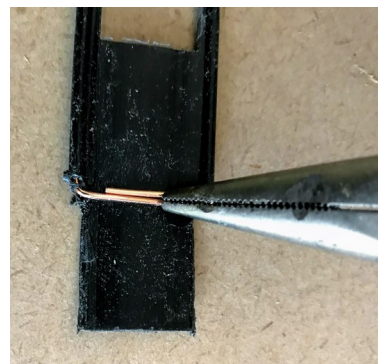


Start out with about 54 inches of 450 Ohm ladder line and at least 80 inches of RG-58 coax.



Strip sufficient insulation from your ladder line to fold both ends together.

Try to keep a plastic tab there

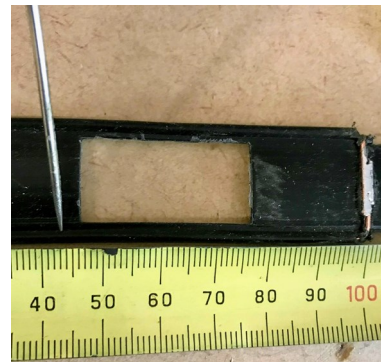


Bend the wires together at 90°, then clean both stripped wires so that there is no corrosion and they're nice and shiny.



Solder the ends together.

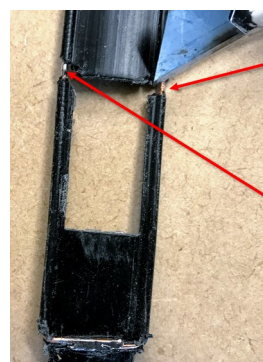
It should look something like this... nice, shiny and smooth



Measure up 57mm (2.25") from the bottom joint to mark the coax connections



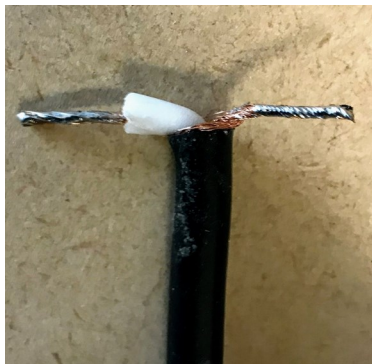
Remove the insulation at the 2 marks.



Clean the bare wires so they are nice and shiny.

Tin the joints with solder

April 2019



Strip the coax end as shown

You want it to look like a sharp 'T'

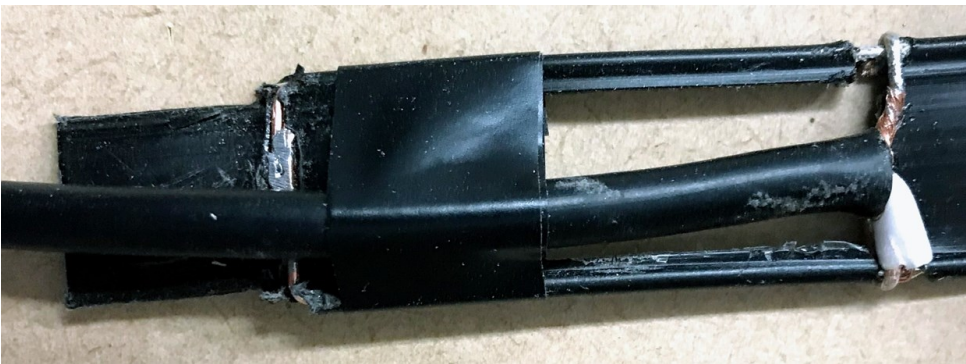
Be careful of stray wires from the braid

Tin the joints with solder

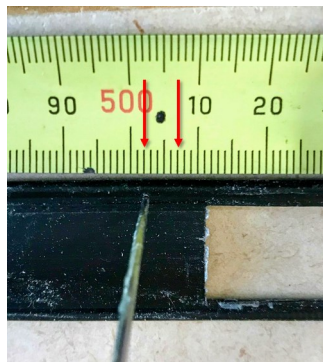


Solder your prepared coax, maintaining that 'T' shape

Careful not to melt the centre insulation



Add some tape for mechanical strength. It should look like this now.



On the braid side of the coax, mark the spots for the 7mm (.25") cut-out at 502 and 507mm (19.75 and 20") from the soldered end.

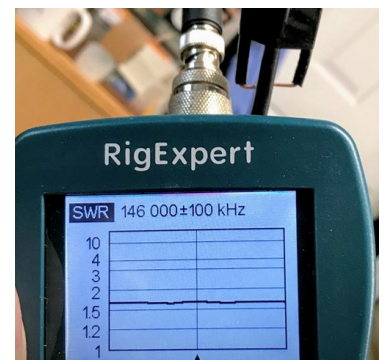


On the braid side of the coax, where you marked, remove 7mm (.25") of the wire



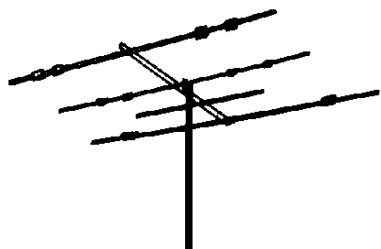
[left] You can add a hole and a string for easy hanging but don't use metal.

[right] If you're on track, your SWR should look something like this. Trim the side of the ladder line connected to the coax centre conductor to tune the antenna for minimum SWR at 146 MHz.



Above the notch, the ladder line wire on that side has no purpose. You can use shorter ladder line to make the antenna smaller and lighter and substitute this 'missing' ladder line with a single conductor wire approximately 36 inches long.

If you're using ladder line for the entire length and your antenna will not tune properly. Cut a second notch 15-20 cm (6-8 inches) from the top, on the same side as the first notch. Occasionally the second side (the disconnected parallel conductor) acts as a parasitic element, and in some situations de-tunes it.



Antenna Adventures 3

John Schouten VE7TI

A Homebrew 2m Tape Measure Yagi

This homebrew antenna is one of my favourites because it is so versatile yet so simple to construct. I have used it as a very sensitive antenna for everyday use on the 2m band, but also for fox-hunting and for satellite work. The cost is probably less than \$10 and likely less if, like most Hams, you have a box full of treasures and parts you save just for projects like this.

The design and article are from a post by Joe Leggio WB2HOL. The dimensions have been modified slightly to better support a cheap (as in free) tape measure from [Harbor Freight](#).

Description

This antenna evolved during my search for a beam with a really great front-to-back ratio to use in hidden transmitter hunts. This design exhibits a very clean pattern and is perfect for RDF use. It trades a bit of forward gain in exchange for a very deep notch in the pattern toward the rear. (You could optimize the design for more forward gain, but at the expense of a really good notch in the pattern toward the rear.) It is a design that can be constructed using only simple hand tools (no machine shop needed) and still perform well. It has been duplicated several dozen times by other local hams and has been successfully used as a club construction project.

When I designed this antenna I had one basic idea in mind. It had to be easy to get in and out of the car when hunting for a hidden transmitter. This would be accomplished by the use of steel "tape measure" elements. These elements could fold easily when fitting the antenna into my car and yet still be self supporting. I decided to use three elements to keep the boom from getting too long.

Another of my design goals was to use materials that were easy to obtain. I chose to use Schedule-40 PVC pipe and fittings available at my local hardware store for the boom and element supports. These kept the cost for the antenna very low. The element supports consist of PVC crosses and tees.

Since I had never seen any plans for an antenna using elements made from 1 inch wide steel "tape measure," I had to do the design myself. To assist in the design I used a shareware computer aided yagi design program written by Paul McMahon VK3DIP. It allowed me to optimize the antenna for the cleanest pattern combined with the best front-to-back ratio.

Performance Predicted by YAGI-CAD

GAIN 7.3 dBd

Front-to-Back Ratio >50 db

3 db Beamwidth E = 67.5 degrees

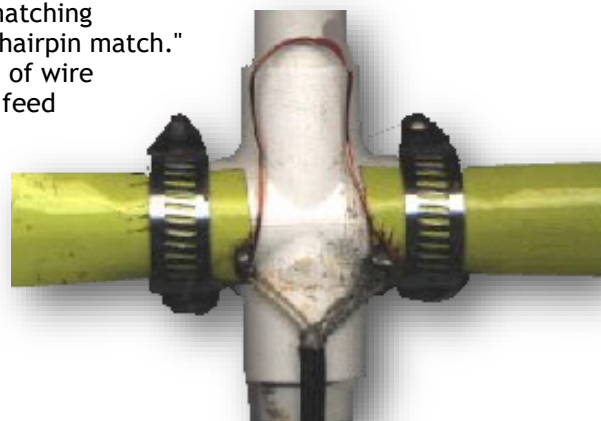
3 db Beamwidth H = 110 degrees

When I first built this beam I found it needed a matching network of some kind to have a low SWR. My first attempt was a Gamma match. This was unwieldy. The driven element could barely handle the weight and the Gamma match itself was not very flexible. The best matching network turned out to be a "hairpin match." This is simply a 5 inch length of wire that is connected across the feed points of the driven element. The antenna has some capacitive reactance without the matching network. The 5 inch length of wire



Above: Measuring tape makes an ideal satellite antenna, especially if both 2m and 70cm elements are added.

Below: The 'hairpin' match.



April 2019

has just enough inductance to cancel the capacitive reactance. This resulted in a better match than anything else I had tried.

The wire I used for the hairpin match was enamel insulated 18 gauge solid. Other hams who have duplicated this beam have used just about anything they had on hand. 14 gauge house wire works well, so does a length of 22 gauge hookup wire. It does not seem to matter if it is stranded or solid, use whatever you have available. This results in a very good match across the two meter band once you have adjusted the distance between the halves of the driven element for minimum SWR. (1 inch apart on my prototype).

I used a pair of shears to cut the tape measure elements to length. An old pair of scissors will probably do as well. No matter how you cut the elements be very careful. Those edges are very sharp and will inflict a nasty cut if you are careless. Use some sandpaper to remove paint where connections are made and for the really sharp edges and burrs resulting from cutting the elements to size. I put some vinyl electrical tape on the ends of the elements to protect myself from getting cut. I encourage you to do the same. It will probably be best if you round the corners of the elements once you cut them. Wear safety glasses while cutting the elements. Those bits of tape measure can be hazardous.

Don't have a broken tape measure?

These Harbor Freight coupons are everywhere, just like their stores. The easiest way is to search online but they are printed in almost any 'Do It Yourself' magazine.



The RG58 coax feedline is connected directly to the driven element. No matter what method you use to attach the feedline, make sure you scrape or sand the paint off the tape measure element where the feedline is attached. Most tape measures have a very durable paint finish designed to stand up to heavy use. You do not want the paint to insulate your feedline connection.

If you are careful, It is possible to solder the feedline to the element halves. Care must be taken since the steel tape measure does not solder easily and since the PVC supports are easily melted. You might want to tin the tape measure elements before mounting them to the PVC cross.

If you decide not to solder to the tape measure elements, there are two other methods that have been used to attach the feedline. One method employs ring terminals on the end of the feedline. The ring terminals are then secured under self tapping screws which hold the driven element halves. This method does not allow you to tune the antenna by moving the halves of the driven element. 6-32 bolts and nuts could be used if holes are drilled in the elements near the ends. If the bolt heads are placed nearest the PVC fitting, you could secure ring-terminals with nuts and lock washers. Another possibility is to simply slide the ends of the feedline under the driven element hose clamps and tighten the clamps to hold the ends of the coax. I know this is low-tech, but it works just fine.

Stainless steel hose clamps are used to attach the driven element halves to the PVC cross which acts as its support. This has the added benefit of allowing you to fine tune your antenna for lowest SWR simply by loosening the hose clamps and sliding the halves of the driven element either closer or further apart. By using the dimensions specified, I found that the SWR was 1:1 at 146.565 Mhz (our Fox-Hunt frequency) when the two elements were spaced approximately 1 inch apart. Figure 1 shows the method used to attach the driven element to the PVC cross.

I used 1 1/2 inch hose clamps to attach all the elements on my prototype beam. Others who have duplicated my design have used self tapping screws to attach the elements to the PVC crosses and tees. Performance is the same using either method. The screws are much less expensive but they do not hold the elements as securely. If you do not use 1/2 inch PVC fittings but instead use 3/4 inch, make sure the hose clamps you buy are large enough to fit.

If you wish a slightly neater looking beam, use the self tapping screws. If you do not mind spending a few more dollars for the hose clamps, use them instead. If I were to build another beam I would use screws for the director and reflector, and hose clamps for the driven element. That would give me the best of both methods.

Rubber faucet washers have been used by some builders between the tape measure element and the PVC fittings on the director and reflector. These allow for the tape to fit the contour of the PVC fitting and will make the antenna look better. Now you know what to do with those washers left over from the assortment you once purchased; You know the ones I mean, the washers that do not fit the faucets you have in your house. If you are an apartment dweller, ask around, these things are stashed in almost every homeowners basement or garage.

Construction:

Cut a length of tape measure to 41 3/8 inches. It will be the Reflector element. Cut two lengths of tape measure to 17 3/4 inches. These will be used for the Driven element. Cut one length of tape measure to 35 1/8 inches. It will be used for the Director. Once you have cut the tape measure to length, put vinyl tape on the cut ends to protect yourself from the sharp edges. You will want to scrape or sand off the paint from one end of each of the driven element halves so you can make a good electrical connection to the feedline.

If you are planning to solder the feedline to the driven elements it is best to tin the elements first before attaching them to the PVC cross. If you don't, the PVC will melt as you apply heat to the element. It would be a good idea to also take the time to form the wire used for the hairpin match into a "U" shape with the two legs of the "U" about 3/4 inch apart. Tin the ends of the hairpin if you plan on soldering it to the driven element. If you tin 1/4 inch of each end of the hairpin it will leave 4 1/2 inches to shape into the "U".

You will need to cut two lengths of PVC pipe to use as the boom. One should be cut to 11 1/2 inches. It is used to form the boom between the Director and the driven element. The other piece of PVC should be cut to 7 inches. It will be used between the Reflector and the Driven element. Just about any saw will cut through the soft PVC pipe. I used a hacksaw. When we mass produced this antenna as a club project, we marked the pipe and used a portable jig saw to cut the lengths in assembly line fashion. It took longer to measure the pipe than to actually make the cuts. Since the pipe is available in ten foot lengths, you can make a few beams from a single 10 foot length. In any case, you might want to cut a few extras lengths for your friends. They will want to duplicate this once they see your completed antenna.

At this time you can pre-assemble the PVC boom, crosses and tee which will support the tape measure elements. I did not use any cement or glue when I assembled mine. The PVC pipe is secured in the fittings with a friction fit.

The hose clamps I used are stainless steel and have a worm-drive screw which is used to tighten them. They are about 1/2 inch wide and are adjustable from 11/16 inch to 1 1/2 inch diameter. Attach the tape measure elements to the PVC fittings as shown in the accompanying drawing. It is normal for the Reflector and Director elements to buckle a bit as it is tightened to the PVC Tee and Cross. You can eliminate this buckle if you use the washers and self tapping screws to attach these elements instead of the hose clamps. I do not think the beam will withstand as rough a treatment as when hose clamps are used.

"It works as well as a \$200 commercially made Yagi antenna"



Above: A 2m/70cm combination

Below: A close-up of the driven element connection



April 2019

How does it perform?

It works as well as a \$200 commercially made Yagi antenna.

Once you have completed your beam you probably will be interested to see if it performs as well as the computer predicted. The SWR should be less than 2:1 across the entire two meter band. The front-to-back ratio is predicted to be very good with the antenna exhibiting a very deep notch in its pattern towards the rear. The YagiCad 4.1 program produced these antenna pattern graphs showing the pattern [see below] that you should expect.

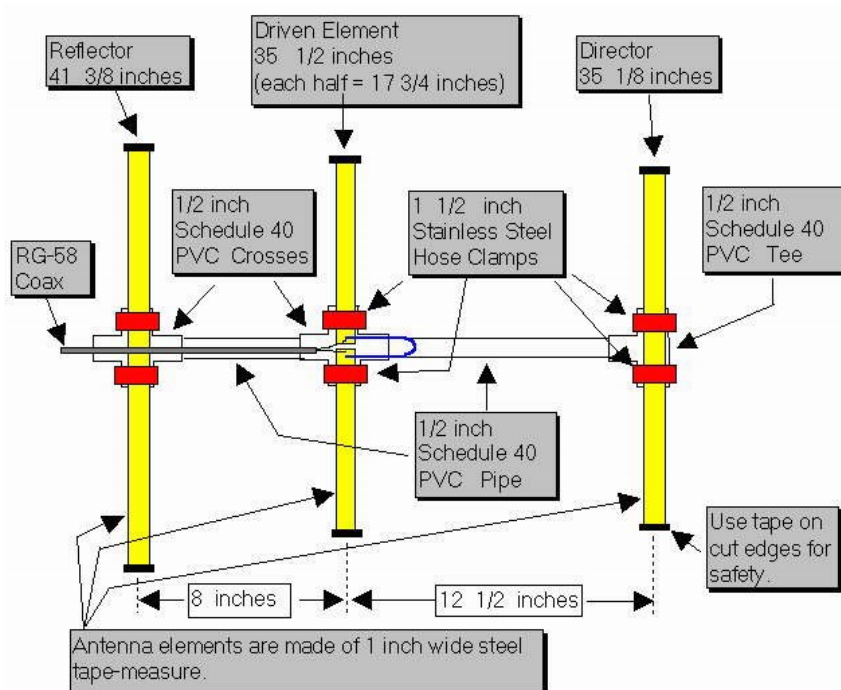
How does the tape measure beam "measure up?"

WB4SUV and WA6EZV used a storage scope connected to a copy of this antenna constructed by KC8FQY and provided the picture of the actual antenna pattern. I am very happy to see that the computer prediction of a clean pattern with a really great front-to-back ratio was accurate. What do you think?

Summary

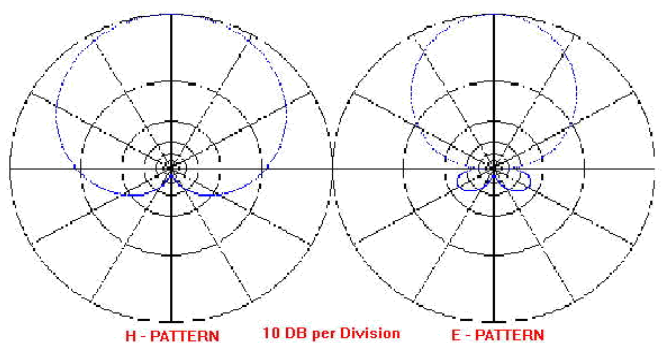
This beam has been used on Fox-Hunts, on mountain tops, at local public service events, outdoors, indoors in attics, just about everywhere. The SWR is typically very close to 1:1 once adjusted. Front to back performance is exactly as predicted. The null in the rear of the pattern is perfect for transmitter hunts. When tested using a sensitive field strength meter and a low powered fox transmitter, full scale readings were seen from a distance of ten feet. With the same field strength meter I was able to point the antenna away from the transmitter and move the reflector element to within a few inches of the transmitter antenna and still not see a reading. I don't have the facilities to verify a 50 db notch as predicted by the Yagi-Cad software but It sure seems close. The flexible elements have taken a lot of abuse. My antenna has seen a lot of use and has held up quite well. Best of all, when on a fox-hunt, this beam is a breeze to get in or out of the car.

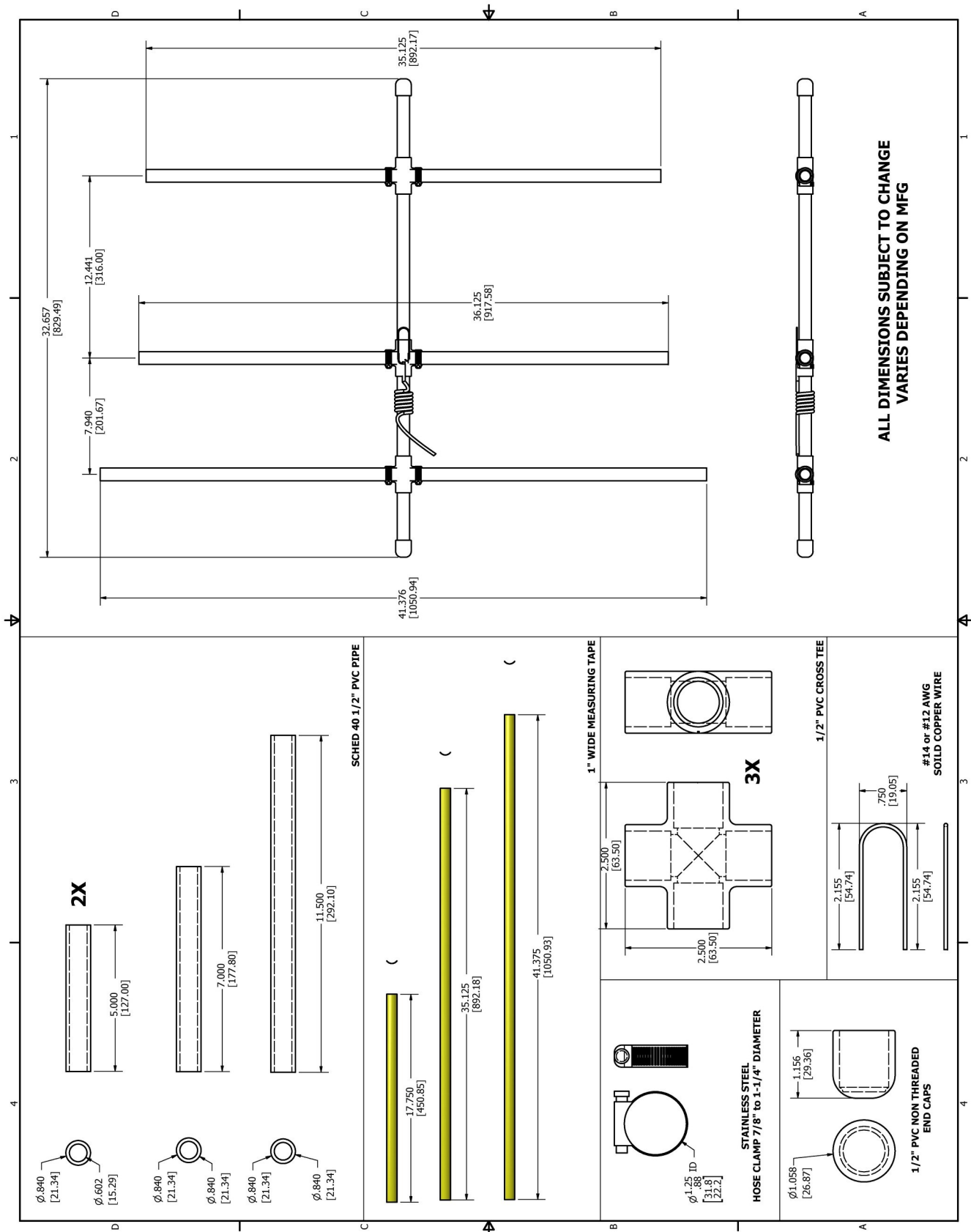
~Joe Leggio WB2HOL



Above: Joe's original pattern and dimensions.

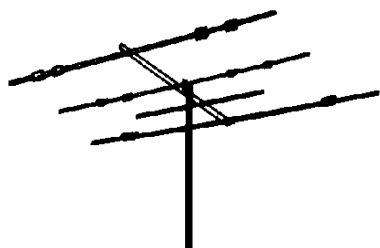
Below: The propagation pattern. Right: A more ornate 'Hairpin' match





An almost identical tape measure Yagi design that works extremely well with the "Harbor Freight" tape measure

April 2019



Antenna Adventures 4

Charles Hanebuth KH6HNL

An End-Fed 6-40m Multiband HF Antenna

Introduction

This project produces an inexpensive, multiband, end fed HF antenna matchbox that is quick and easy to setup and use. The end fed feature adds portable convenience, but does present another issue. The problem with an end fed half wave antenna is that the antenna presents high impedance, creating a significant mismatch with the usual transceiver impedance of 50 ohms. This mismatch is significantly greater than typical tuners can accommodate without a matching transformer.

This project creates a trifilar wound, 9:1 UNUN (unbalance to unbalance) toroid matching transformer that will match the high input impedance of an end fed antenna into the range where most antenna tuners can produce good performance. The matchbox handles 100 watts of power. This project requires an antenna tuner to achieve satisfactory SWR.

The matchbox project uses readily available common hardware and materials listed below.

Matchbox Parts List

- 1 small plastic enclosure and cover (shown left)
- 1 powdered iron toroid T130-2
- 3 20" pieces of 22 AWG solid insulated copper wire in red, green, and black
- 2 # 8-32 x 3/4" hex head machine screws
- 2 # 8 lock washers

- 2 # 8 ring wire lugs
- 2 # 8 flat washers
- 2 # 8 lock washer/nut combination
- 2 #8wingnut
- 1 SO-239 panel mount connector to fit keyed enclosure opening
- 30 foot # 18 AWG insulated stranded wire antenna with ring lug attached
- Few drops of clear PVC adhesive to secure cover in place Clear silicone caulk to secure toroid in place

Preparing the Matchbox

Plastic Enclosure

Drill one 5/8" hole for the SO-239 connector, and one 11/64" hole for the counterpoise wing nut on the lower side of the enclosure. Next, drill an 11/64" hole in the upper right side of the box for mounting the antenna connector.

Toroid Winding

Next wind the three 20" pieces of insulated solid wire onto the toroid. Place the wires as shown green-black-red, and wrap the toroid 9 turns so that it looks like the photo on the right. Notice there are three wires extending from the left winding and three wires extending from the right winding. As the connections are completed, the steps refer to the specific wires by left or right and color.



Plastic Enclosure

NOTE: Count turns by counting the number of times the wire goes thru the toroid center.



Crimp together and solder the left black wire with the right red wire. When the step is completed, it will look like the photo.

The next three steps should appear as shown in this photo. Crimp and solder a #8 lug to the left red wire about 2" from the toroid. The completed lug will later connect to the antenna connection bolt on the upper inside of the enclosure.

Twist the left green wire with the right black wire. Strip the ends of the two wires and twist together at about 2". This twisted pair will solder to the center connection of the SO-239 connector in a later step.

Trim and strip the remaining right green wire at about 2". Cut an additional 2" piece of green wire, and crimp and solder both wires to a #8 lug. The 2" green wire will connect to the ground connector on the SO-239 already installed in the enclosure. Strip remaining green wire end 3/8" and bend into a hook for connection to the SO-239 ground connector.



The SO-239 connector and ground lug should be installed through the keyed hole in the lower right with the mounting nut securely tightened.

Solder the green and black twisted pair to the SO-239 center connector. Solder the green wire hook to the ground lug on the SO-239 connector.

From inside the box, place an 8-32 machine screw through a lock washer, the #8 lug on the green wire, then through the lower 11/64" mounting hole. Place a flat washer on the outside protruding machine screw followed by #8 lock washer/nut and tighten securely. Place a #8 wing nut on the machine screw to finish the counterpoise connector.

Position the toroid inside the box to allow connection of the red antenna wire lug to the 8-32 machine screw on the upper right box side.

Place an 8-32 machine screw through a lock washer followed by the #8 lug connector on the red wire, and put it through the 11/64" hole on the top. Place a flat washer on the outside of the box followed with a #8 lock washer/nut. Tighten the nut securely. Next, place the wing nut on the antenna connector and your project appears as shown above.

A small spot of clear silicone compound is used to secure the toroid from movement in the enclosure. The only remaining assembly step is to securely glue the box cover in place with PVC cement.

Preparing the Antenna Wire

Matchbox performance will be determined by two factors: The length of the antenna wire, and the capability of the tuner. The length of the antenna wire should be between 24 and 60 feet for best performance. Additional counterpoise is not normally required, as the coax shield provides the counterpoise function. Wires longer than 60 feet may have excessive impedance for some tuners to properly match. Wires shorter than 24 feet may not radiate as effectively. A 30 foot insulated 18 gauge stranded wire antenna and connecting lug is included with the project and should meet most requirements without need for any counterpoise.

Experience has shown that most external tuners and some internal tuners will tune 80-6 meters

The commercial version



April 2019

It took me 10 minutes to install and WOW - within 10 minutes I made my first HF contact (from CT to GA). And in the span of 4 hours made 3 more !! I was transmitting just 5 Watts from Yaesu 857ND using this antenna. This antenna rocks ! Thanks a ton ! 73

with an antenna length of 24' to 30'. If a longer antenna is desired, the provided antenna can be lengthened.

Some tuners, in particular internal tuners, may not tune the full 80-6 meter range. You may need to try different wire lengths to optimize your antenna configuration. If you are having difficulty getting your rig to tune, start with a 26' wire. This should produce good results on at least 40-6 meters using the narrowest performance range of internal tuners.

Best performance is achieved with a coax of 16' or longer with the coax shield providing the counterpoise function. Additional counterpoise is usually not required in this design, although the lower wing nut provides a convenient counterpoise connector if needed. The end fed antenna system works well in horizontal, sloper, and vertical configurations.

Observe established safety practices when working with antennas, and avoid proximity to power or utility wires. Permanent installations should be equipped with appropriate static and lighting protection.

Keep amateur radio safe and fun!

Feedback on 6-40 End Fed Matchbox Antenna

The antenna is amazing. I receive fantastic signal report from DX stations as well as hams around the country. I previously used a short version GR5V that was in an inverted V configuration on the roof of our house. This antenna was noisy but worked. Your antenna out performs the prior antenna and is much quieter. Thanks again for the fine product that your club offers. May 2012

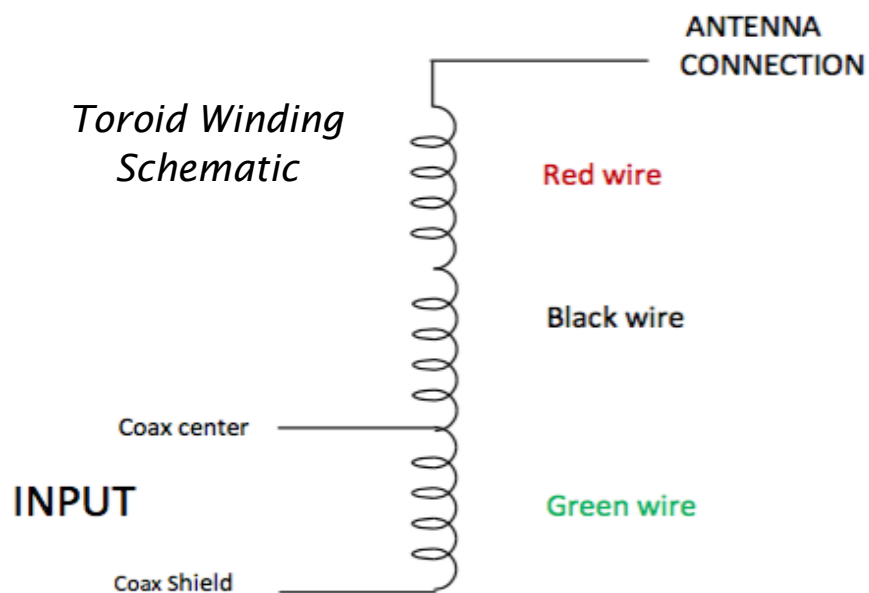
The 6 - 40 Matchbox antenna works great! Easily tunes with the Z100 tuner - very low SWR's on 20m thru 10m. Antenna was up about 45 feet on tree branch - wire length was about 52.5 feet, slight slope, 55 feet of coax, line isolator at radio. Work Hawaii for the very first time. Guess the antenna wanted to call home :) 5-7 report, 100 watts, 15 Meter band, Icom 718. A great portable antenna that I will use often at Montrose Harbor along the lakefront in Chicago. Thank you for a fine, well made product. April 2012

It arrived today in fine shape. I got it up in the air this afternoon using a 30 foot radiator. Top is at 45 feet. Loads on all bands 80-10M with my LDG auto-tuner absolutely no problem, My first QSO was KH7X in the ARRL SS contest with 100W. Amazing. This thing rocks! It's a great antenna! Nice job and a great buy. November 2011

I set-up my jackite pole today and tried a 68' wire with the 9:1 unun matchbox. I set it up as an inverted L with about 26 feet vertical and 42 feet horizontal. With my IC-703 it tuned 80 through 6 all well below 1.5:1. I am going to leave the antenna up a few days and make a few contacts. I think the matchbox is terrific. October 2011

My 6 - 40 meter end fed arrived through the UK holiday mail and I departed from my norm of a sloper and mounted it vertically on a 10m fishing pole. It is surprisingly effective and rewarded me with a surprise contact on 17m into the Falkland Islands at 20:30UT last night. January 2012

When I attached it to a 10m fiberglass fishing pole and went vertical - wow! Easy 5/9 contacts out to 6,000+ miles when propagation was anything better than the worst. My simple ATU easily matches the antenna with SWR never greater than about 1.4 on any band it is built for. December 2012



You can dither and procrastinate, but with this antenna, you'll be talking to the world in no time on any

band that happens to be hot - and with your hard-earned cash hardly touched! January 2012

Just wanted to report back that I have tossed the antenna into a tree about 20' up in an inverted vee shape and I am pleased to report that I can tune anywhere I need on 40-10M using the TS-590 internal tuner!! My first contact was on 40M within 10 minutes of erecting the antenna and was all the way to TX from my condo here in MI using just 10 watts. This is by far the best HAM related investment I have made in a long time. Living in a condo with strict association rules, I am able to conceal this wire in a tree out my bedroom window and talk all over. I'm very happy and would recommend this antenna to anyone in a similar situation. March 2013

I have had your multiband end fed antenna installed here in Singapore for a few weeks now and am very pleased. I used the wire from my previous antenna which is 66 feet long. It works beautifully! I have it hanging vertically outside my 15th story apartment window on a 5 foot horizontal pole (to get it away from the reinforced concrete building). A couple of fish weights on the end keep it from blowing around too much. I would recommend this antenna to anyone who is facing a challenging QTH. April 2013

I received my antenna yesterday, a quick 4 days since I ordered it. I attached it to a 31 foot pole and my IC-706MK2. Within minutes, I made my first contact with 9A4KW in Zagreb, Croatia on 20 meters. Being able to reach out over 4,000 miles gives me real confidence that I have found my portable antenna. Thanks for your rapid response and fine product. May 2013

In only 2 weeks of casual on-air time. If you could see how I had to zig-zag it through a big tree above the roof of my RV, you'd be saying like I am, "how the heck can that work? I worked 90% of the stations I called, and just added Mexico City on 15m that gave me a 5x9. September 2013

Just wanted to let you know how pleased I am with my ERAC matchbox antenna. I put the EARC antenna in the backyard with the feed point at 4 feet and the wire sloping up

to 35 feet. I have 125 feet of coax feed line. My transceiver's built-in antenna tuner will adjust the SWR to below 1.2 to 1 on all bands 80-6 meters. Last weekend I worked 65 countries on 5 continents. I live in an antenna restricted community and this antenna has allowed me to enjoy ham radio again. February 2014

I used the EARC Matchbox today. It works GREAT on 20m with a 30 ft radiator in vertical positioning, fed with 25ft of RG175/u coax. I've been talking up and down the east coast with 3W on SSB all afternoon! People ask me to repeat my power output again and again. I can't wait until I get the chance to use it at night, where I think it'll really shine! This has a permanent place in my portable kit. Thanks for the great product! April 2014

I performed a simple install in Virginia making it vertical by using a 28 foot fiber glass kite pole. Within 30 minutes (NO KIDDING) I was receiving Lebanon on 17 meters! I also worked Russia and Eastern Europe that night on 20 meters. I love this antenna and I give it a 100% (5 STAR) rating. May 2014

This little box is magic. NY, IA and NM from GA with ease on 100w June 2014

Just wanted to let you guys know, this matchbox is wonderful. I built the matchbox, connected it to 55 feet of solid #14 about 20 feet in the air. My rig is a Yaesu FT-817ND connected to a MFJ-971 tuner with coax running between the tuner and the matchbox. So far I have worked Slovenia twice, Morocco, St. Helena Island, Cuba, Costa Rica, Vermont, Wyoming, Florida, North Dakota, Brazil, and Colombia. This setup works really well on the higher bands. Thank you for putting this design on the internet. I like it so much its become permanent here. September 2014

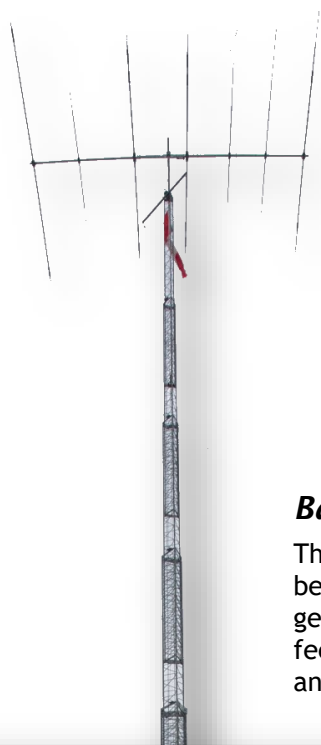
This antenna continues to amaze me. It worked well U-shaped "indoors" with 50 watts, and now outdoors as a sloper. It easily loads 10-40m with my TS-570s internal tuner. I'm sold on it and own two of them now. I'm working at least 90% of the DX I chase. I have no RFI in the shack either. November 2014

~ Charles Hanebuth KH6HNL
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You may purchase an assembled End Fed Matchbox 6-40 Meter Antenna with USPS priority mail delivery in U.S. on eBay

We ship promptly upon payment and you will likely receive your order in 5 days or less. If you have any questions about your order, please email chanebuth@yahoo.com

April 2019



Antenna Adventures 5

Howard Groveman W6HDG

The Fence Fan Dipole

Background

The multiband fan dipole has always been a popular antenna choice for getting on several bands with a single feedline and without the need for an antenna tuner.

which are mounted to a common parallel feedpoint so that a single feedline can be utilized. Some nice designs are easy to find on the Internet or in antenna handbooks. Most designs now suggest (based on Stanford Research Institute data) that the feedpoint be separated by as much as 5.5 inches between dipoles and that the lower frequency (longer) dipoles can be about 4% shorter than the 468/frequency in Mhz would dictate whereas the higher frequency (shorter) dipoles need to be about 4% longer. Many designs also recommend the controversial “ugly balun” choke in the design which is nothing more than 18-21 feet of coax close wound on a 4” or greater non-conductive form at the feedpoint..

The “Ugly Balun” choke type balun using coax windings is great for a single band antenna, but the number of turns determines its effective choke frequency - so it is impossible to cover 80 through 6 meters with one coil of coax. I had heard wonderful reports of the baluns designed by the late Jerry Sevick W2FMI. These designs were now being made by Mike Lapuzza, KM5QX who



A Quick, Easy and Inexpensive Home-brew Multiband Antenna

The height is limited only by the nearest tall tree and the cost of the antenna is minimal. The antenna is also rather stealthy - especially if 16-18 gauge wire can be used in sub 200 watt installations. The antenna basically consists of two to five or more distinct half wave dipoles



runs Clear Signal Products at website www.coaxman.com. Mike was kind enough to make a special version of his 823A balun (*right*) without the eyebolts so that it would fit inside my PVC drainpipe. This fit inside the pipe at the same location where the external coax windings were removed. The balun worked like a charm and I have since received nothing but great audio reports - even after adding an Elecraft KPA500/KAT500 amp/tuner combo to my station. Mike hand makes the baluns, so he is very open to special orders like mine.

There are certain downsides of the traditional fan dipole in that the top wire must often support the entire weight of the antenna as well as the balun. The need to ideally spread out the feedpoints by up to 5.5 inches also makes the feedpoint area rather cumbersome. Complicated spreaders must also be used in order to keep each dipole taut and well separated when there are only 2 end attachment points. There also can be some interaction among the dipoles and some detuning may occur if a dipole is included which is a frequency multiple of 3 from a longer dipole in the system (3rd harmonic). For example a 30 meter, 15 meter and 6 meter $\frac{1}{2}$ wave dipole may not be possible if an 80 meter, 40 meter and 17 meter dipole exists. A possible match may be obtained on 30 meters, 15 meters and 6 meters using the existing longer dipole but testing is required. Finally, it is difficult to trim and tune the antenna, since a single rope or rope-pulley system supports the entire array and it must be completely taken down for wire tuning or repair.

Objective

I am just getting back on HF after a few year hiatus and have moved to a neighborhood with some antenna restrictions. My rig is a Yaesu FT-857D and Astron 30 amp power supply. I have

no tall trees on the property but do have one large feature on the property - a 45 year old tennis court with 12 foot fencing all around it. Each long side of the fencing is 120 feet total (a nice sounding number to dipole fans).

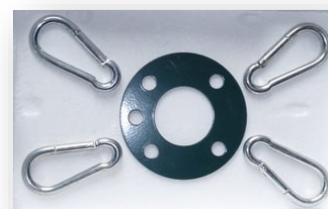
I decided to try an inexpensive antenna design as a starting point "just to get on the air". I figured that if I lashed a 10 foot section of schedule 40 PVC pipe to a central fence support with hose clamps, I could get an inverted-V up at around 20 feet at the center (not an ideal height for DX, but certainly usable). I then figured that I could use the dipoles themselves as "guys" for the central support if at least two of the dipoles were attached on a short offset support on both sides of the fence. The other dipoles could be "bungeed" directly to the fence mesh to keep them taut.

In researching lightweight support poles, I found an alternative to PVC pipe from John at <http://goverticalusa.com>. John sells new and used surplus military style fiberglass and aluminum 4 foot mating mast sections. The aluminum and fiberglass poles can be used in combination and fit together perfectly. To get to my goal height of 36 feet, I decided to use 6 stiffer aluminum sections for the lower mast and 3 fiberglass sections for the upper mast. My reason for using fiberglass was so that there were no metal sections at the top to interfere electrically with the dipoles.

John also makes a very nice guy ring (*right*) which can be inserted at any joint in the sections. I placed the guy ring at 24 feet so that I could guy the mast at that point using some Dacron rope. I fashioned two additional $\frac{3}{4}$ inch PVC outriggers to the fence to support the ropes from this guy ring in a 360 degree fashion (see final antenna picture). Remember, my lowest 12 feet of mast was solidly supported by hose clamps along the 12 foot high tennis fence. At the top (36 feet), the antenna would be "guyed" in the same way it had always



I decided to try an inexpensive antenna design as a starting point "just to get on the air".



April 2019



Materials used in construction

been, by attaching the dipoles to the fence top with tarp style bungee straps (using some PVC outrigger poles at the fence top to keep the antenna balanced at the vertical). With the increased height, I now needed to add some Dacron ropes to some of the dipoles to fan them out properly along the fence.

The result has been worth the effort. The only downside of the increased height is that the entire mast would need to be lowered for any work to be done on the antenna's individual dipoles. You can't tilt over 36 feet of military poles without damaging them, so the antenna must come down the same way it went up - by removing (adding) one section at a time from the bottom as you slide the pole down (up) through the loosened hose clamps. Not very elegant but doable with a couple of people.

The advantages of my Fence Fan Dipole (FFD) design is that just about any sturdy fence that spans the linear distance of the lowest band can be used. The center feedpoint and balun can be made from a single two foot section of 4" drainpipe with end caps for weather resistance. This could be attached and supported atop a central PVC support pipe with appropriate threaded plumbing adapter and an electrical metal threaded nut available at most hardware stores. See construction images below. Each dipole is separately lashed to the fence with a bungee-like tarp strap so individual band tuning does not require entire antenna takedown. Dipoles can be easily attached and changed at the retention/relief posts along the drainpipe for testing, experimenting and possible future repairs. Finally, excellent spreader distances between dipoles at each endpoint can be achieved.

Construction

RG-8X coax and PL-259 connectors with adapters were the only ham radio specific parts.

The remaining parts were all obtained during a couple of trips the nearest Home Depot (*see margin photos*):

1. 18 gauge bare stranded copper "ground" wire is about \$17 for 250 feet and worked extremely well. The 250 feet was just a few feet short for all dipoles so I made my 17 meter dipole from heavier bare copper stranded antenna wire I had on hand. If any of the copper is tarnished, it can be quickly rejuvenated by soaking in a few ounces of vinegar with a half teaspoon of salt added. This allows the copper to be solder-ready in the necessary spots.
2. Two foot section of 4" ABS drain pipe with 2 end caps.
3. Ten foot section of 1 inch schedule 40 PVC with threaded PVC adapter and a metal retention nut sold in the electrical section for threaded pipe.
4. Three hose clamps to attach the PVC to a vertical member of the fence post.
5. Copper clad plumbing strapping, copper electrical lugs with setscrews (Burndy KA4CBAG2R), Ten 1/4 inch x 1.5 inch eye bolts, two solder lugs for coax attachment, ten 1/4 inch



lock washers and a total of twenty ¼ inch nuts (ten of which are included with the eye bolts).

6. Four short 18 inch pieces of PVC to be use as fence “guy” standoffs along with four U-Bolts for attachment (*see close-up image on page 20*).
7. Ten tarp straps (bungee cords).
8. 10 Plexiglas rectangles prepared from a single 12”x12” sheet of 1/8” Plexiglas. Each rectangle about 3 inches by 1.5 inches with holes drilled on each long end.

Construction is quite straightforward if you study the images. I separated the 80 and 40 meter dipole eyebolts by the full 5.5 inches. I compromised and separated the 40 and 20 meter dipoles by 4.5 inches, 20 and 17 meter dipoles by 3.5 inches and the 17 and 10 meter dipoles by 3 inches. Each of two copper clad straps run the length of eyebolts along the inside of the ABS pipe. The coax lugs are attached at the eyebolts closest to the “ugly balun”. Lock washers are used between the interior nut and the copper strapping. The balun itself is about 16 turns of RG-8X (21 feet) with epoxy used to seal the two inlets. The RG-8X then runs down the inside of the PVC support pipe. I used a barrel SO-239 at the bottom of the support pipe for convenience. I painted the coax, the ABS pipe and PVC all brown to keep things stealth.

A note about using two of the dipoles as “guys” to keep the flimsy PVC support pipe upright: If I had bungeed all dipoles to the fence mesh itself, I would not have had support in the “Y” plane to keep the PVC support pipe upright. I could have used two opposing rope guys for this purpose, but didn’t want to have any ground mounted supports. So I fashioned 18 inch fence top extenders by grinding a corresponding arc in an end of a piece

of PVC and used a U-Bolt through the PVC to create a sturdy standoff from the fence. Good “Y” plane support can be achieved by bungee-ing two of the shorter dipoles on each side of the fence with these extenders. This has kept the central PVC pipe quite vertical with resistance to winds we have seen to date (*photo lower right*).

The completed antenna is so stealth, it is quite hard to photograph. Hopefully this image will give you a good idea of the appearance of the support and at least of 3 of the 5 dipoles.

Dipole lengths, after adjusting some of the dipoles with the help of an MFJ-259 antenna analyzer were approximately:

80 meters : 61 feet each side including the loop between setscrew and eyebolt

40 meters: 32.8 feet each side including the loop between setscrew and eyebolt

20 meters: 17 feet each side including the loop between setscrew and eyebolt

17 meters: 13.6 feet each side including the loop between setscrew and eyebolt

10 meters: 8.6 feet each side including the loop between setscrew and eyebolt

Results

The FFD has obvious downsides - non-portability, height compromises and possible interaction with the fence if it is metal. But initial testing has been quite good. During an hour of operating the IARU HF championship July 14-15, 2012, I worked 6 countries on 4 bands including Aruba, South Cook Island, Japan, Argentina, Canada and Mexico.



Materials used in construction



April 2019



*...dipoles and
inverted-V's can
make good antennas*

The antenna has acceptable SWR on 80, 40, 20, 17, 10 and 6 meters and contacts were made on all bands without an antenna tuner. 15 meters is usable.

SWR results were as follows:

- 3.8 Mhz 1.9 (SWR was 2.5 at 3.70, 2.5 at 3.9 and 3.8 at 4.0)
- 7.2 Mhz 1.3 (SWR was under 2.0 across entire band except 2.6 at 7.00)
- 14.13 Mhz - 1.0 (SWR was under 1.5 across entire band)
- 18.14 Mhz - 1.0 and same across entire band
- 21.3 Mhz - 2.9 and same across entire band
- 28.5 Mhz - 1.2 (SWR was under 2.0 across entire band except 2.2 at 29.7)
- 52 Mhz - 1.4 (SWR was under 1.8 across entire 4 Mhz of the band)

I may add a tuner to get a better match on 15 meters and more bandwidth on 80 meters. It is unclear if a dedicated 15 meter dipole would have worked fine or if there would have been detuning - I haven't tried it.

I have no illusions about DX worthiness of this antenna. But dipoles and inverted-V's can make good antennas - especially on the lower frequencies where multi-element antennas are not practical. The multiband variety of the dipole such as that described here, when well tuned, should not suffer appreciably in performance over a monoband dipole at similar height. The advantages of a single feedline cannot be overemphasized.

References

1. A Field Guide to Simple HF Dipoles, Cecil Barnes, et al, Stanford Research Institute, Mar 1967, see

<http://www.scribd.com/doc/50272493/A-FIELD-GUIDE-TO-SIMPLE-HF-DIPOLES>

2. KJ4IF, "The KJ4IF Multiband "FAN" Dipole for 160, 80 and 40 Meters", see

<http://www.hamuniverse.com/kj4iif1608040fandipole.html>

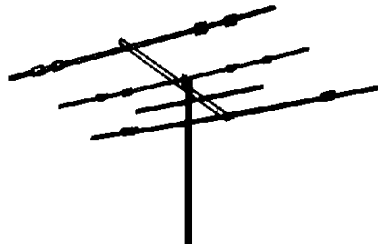
3. N4UJW, "BUILD THIS MULTIBAND FAN DIPOLE FOR ALL BAND HF ANTENNA EXCITEMENT", Sept 2010, see

<http://www.hamuniverse.com/multidipole.html>

~ Howard Groveman W6HDG
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The completed antenna



Antenna Adventures 6

And Now For Something Really Unusual!

2-Meter Square Loop

Credit is given to K0FF for most of this design. We have added modifications that proved useful in the design.

The mods will be presented under modifications in the design instructions. Special thanks to W6ARQ and, KC5BBP for their input on this Antenna.

2 Meter Square Dipole by K0FF

The 2 meter square loop is a folded Dipole around itself. The dimension is 11" X 11".

Here is the parts list and dim. sheet for the 2 meter square dipole, made of copper water pipe.

Parts List

- 1/2 Inch Copper Water Pipe
- Long Sides 9 1/2 inches
- Open Ends 3 1/4
- 2 Short Pieces on each side of "T" 4 7/16
- 4-90 Degree Elbows
- 2-Copper Caps
- 1 Copper Tee
- Brass Plate for SO239
- Gamma Tube 4 3/4 of 3/8 Copper Tubing
- RG8 is 5 1/2 inches long
- Copper or Brass Gamma Tube Bracket
- SO239

Modification Parts

Do NOT use stainless steel

- 6 Brass Nuts-Note Any size
- 2 Brass Screws at least 1 1/2" long

Instructions: The mounting array to be affixed

to a standard mobile mast that presents 3/8 X 24 threads.

Run coaxial cable right to the antenna and connect it to the built in SO-239. There are two adjustments on the antenna to match the coax impedance. Adjust the Gamma Match Tube for lowest SWR, then the tunable stubs move in or out for lower SWR.

Do not use Stainless Steel screws, soldering them to the end caps is almost impossible.

Solder the antenna parts together using 90 degree elbows at the corner open ends, but mind the gap. All measurements are critical. The brass plate to hold them form an "L" 1-3/4" tall with a 1/2" lip.

A 5/8" hole is provided 1-1/4 inches from the bend, and attached using stainless steel or brass hardware.

Two small holes are drilled in the lip and mounted to the copper Tee with #6 self tapping screws.

Solder the 5 1/2 inch piece of RG8 to the SO-239.



April 2019



When using the RG-8, discard the outer shield and use only the Dielectric. Slip the RG8 inside the 4-3/4 gamma tube. The gamma bracket should be at least 1-1/2" long brass or copper.

Secure it with stainless steel screws right before the 90 degree elbow, on either side, it doesn't matter.

The gap between the Open Ends is 2-3/8". Adjustments to the gap in or out can be made with the modification of installing the brass screws on the end caps.

The Antenna is more or less Omni Directional and horizontally polarized. It presents a high takeoff angle and is intended for use in the 144.200mhz area.

The Antenna can handle 100 Watts and has proved useful in working some satellites such as AO-27.

The Antenna provides excellent SSB results while mobile and we have talked with other stations 200 miles away that with similarly equipped antennas.

For further Information on assembly or instruction details eMail the following hams below:

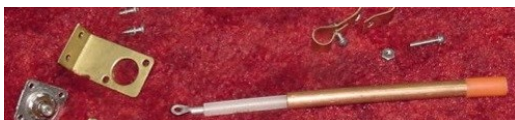
Af4ar6077@aol.com

W6arq@charter.net

Kc5bbp lives too far back in the hills of Tennessee to get daylight...much less email!

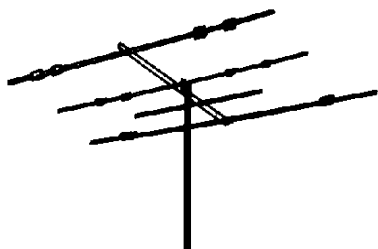
I have found this antenna works very well and, is a solid performer. Best of luck with your antenna.

~ Mike Gunter AF4AR



Social Reminder

The Surrey weekly social gathering is on Saturday at the Kalmar Restaurant at 80th and King George Boulevard between 8 and 10:00 am. You don't have to be a SARC member to participate. Bring your significant other, bring your family, see old friends and have fun.



Antenna Adventures 7

Often Overlooked For Those Missing HF QSOs

Near Vertical Incident Skywave Antenna

What is NVIS?

Near-Vertical Incident Skywave is a combination of radio hardware, skywave radio propagation, operating procedures, cooperation, and knowledge used by a group of radio operators who need reliable regional communications. It fills the gap between line-of-sight groundwave and long-distance “skip” skywave communications.

German ground forces first documented NVIS techniques in WW-II. NVIS was more fully documented, studied, and used by US forces in Vietnam. Radiomen in military vehicles discovered that their HF whips would sometimes work much better when tied down horizontally. Amateur radio operators have been studying NVIS propagation and operating techniques for at least fifteen years. In tactical military use, NVIS allows communications around the region while providing very little groundwave signal for the enemy to home in on. Any radio operator that has used a horizontal antenna well under a half-wave high has used NVIS.

NVIS: Why Do It?

First and foremost, to completely eliminate the skip zone. This enhances all forms of local and regional HF communications, for all practical and experimental purposes.

Emergency groups such as ARES and RACES are studying NVIS propagation, techniques, and equipment deployment for emergency preparedness. NVIS is the tactical communication system of choice in mountainous areas, any areas without complete repeater coverage, and all situations where repeater-based systems have failed or might fail. With the recent release of manufactured mobile and

even portable HF radios, HF, and antennas employing NVIS propagation, should become much more popular and useful for disaster tactical communications.

Researchers and users have observed that NVIS antennas work considerably better in the valley than on the mountain top. This is due to much better ground conductivity in the valley than on the dry, rocky mountain top. This happy fact eliminates a lot of unnecessary climbing, and allows the antenna to utilize trees for both support and cover.

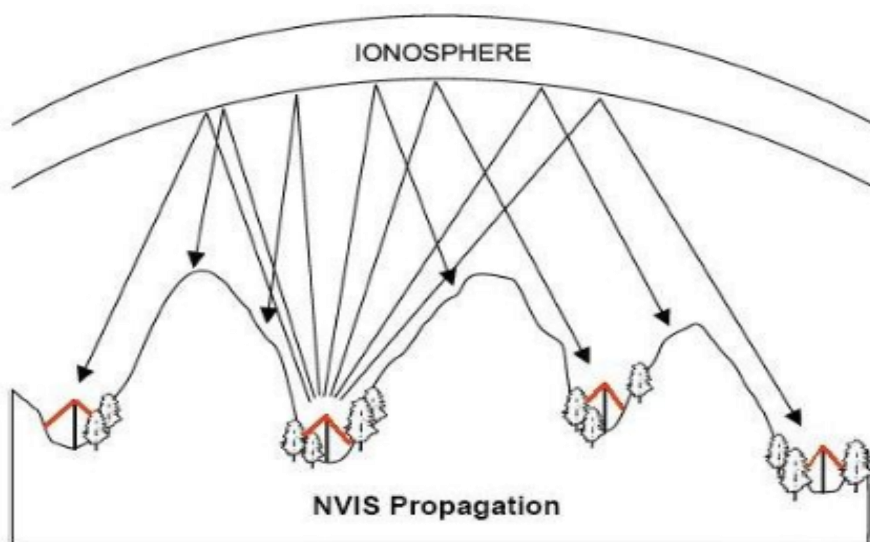
It is often noticeable that in contests, especially Field Day, NVIS is seldom used and NVIS antennas are seldom seen. This translates to missing stations (and lost points) for a radius of up to 500 miles away and sometimes beyond. Given that Field Day is an emergency preparedness exercise, it seems incongruous that those stations we may need to contact in a real emergency would be those within a 500 mile range yet our present HF antennas may ‘overshoot’ them.

NVIS Propagation

NVIS propagation is generally considered to be F-layer ionospheric reflection at angles of 70-90 degrees. It is skywave propagation without the usual skip zone. The purpose of NVIS is to communicate locally and regionally, out to a few hundred miles, with moderate power, simple antennas, and no skip zone. NVIS is typically used on 160, 80/75, 60, and 40-meter



April 2019



bands by Amateur radio operators using relatively low horizontal wire dipole antennas.

When a horizontal dipole is $\frac{1}{2}$ -wave high, it has a wide null overhead, and a main signal radiation pattern shaped like an inverted cone. The reflected wave from the ground is out of phase with the antenna and so causes partial phase cancellation overhead. This makes a good "DX" antenna, with gain at relatively low angles, and a wide skip zone. Problems arise, however, on regional nets and rag chews, because of the skip zone.

As the dipole is lowered below a half-wave high, this inverted cone closes up, the overhead null disappears, and most of the power is radiated upward in a wide lobe shaped like an egg. The reflected wave from the ground is closer to being in-phase with the antenna, increasing the amplitude of the vertical-angle RF power. The effect is somewhat like a 2-element Yagi pointing straight up. At a height of $.15$ to $.2$ wave, over excellent ground, gain can approach 7 dBi, straight up. Imagine pointing a powerful searchlight straight up at a cloud: The resulting bright spot would provide



Military AS-2259/GR

indirect lighting for miles around! With a horizontal antenna suspended well under a half-wavelength high, we achieve the same effect. We deliberately illuminate the F-layer (which varies from about 100 to 300 miles up) with a wide RF flood, which causes indirect RF

NVIS only works at frequencies from 2MHz to 10MHz. The signal must penetrate the D layer of the ionosphere, and bounce off the F layer. Lower-frequency signals will not penetrate the D layer; higher frequencies will not bounce off the F layer at these sharp angles and just goes out into space. Remember the Maximum Useable Frequency, or MUF? So, for amateur radio operators, we're looking at 40 and 80 meters primarily for NVIS use.

A good NVIS antenna will not work well at DX distances. Antenna gain is a zero sum game. There is a fixed amount of energy radiating. If we push it all out in one direction (the near-vertical angles), we have to take it away from another direction (the low DX angles). Regular height dipoles or vertical antennas have a lower take off angle and your signal may be heard thousands of miles away, but not within 300-500 miles due to the skip zone. This skip zone is the area between the maximum ground wave distance and the shortest sky wave distance where no communications are possible. Depending on operating frequencies, antennas, and propagation conditions, this skip zone can start at roughly 10 to 20 miles and extend out to several hundred miles, preventing communications with the desired station. The other term called ground wave is where your signal does reach someone closer. A ground wave signal can go up to approximately 50 miles if conditions, including terrain and obstacles, are favourable. Using no skip zone or ground wave, the NVIS mode is used for making reliable HF communications below 10 MHz effective for a range to 600 miles. The NVIS propagation mode works best on HF below 10 MHz since these high angle radio waves are reflected back to Earth. Most often a low dipole is the best antenna to use and will provide reliable communications.

Building An NVIS Antenna

The following NVIS antenna is based on a military design, the AS-2259 NVIS Antenna, which consists of two V-shaped dipoles: The four dipole wires also serve as guy rope for the antenna mast.

It is resonant at 7245 kHz, 5373 kHz and 3985 kHz as depicted but can be built resonant to other frequencies.

This NVIS antenna is omni-directional, and from our location in SW BC should provide overage of not only Southern BC, but also Washington, Oregon, Idaho, Northern California, and western Alberta.

As shown in the diagram, the wire lengths are as follows:

- 75 Mtr legs = 58.32 ft
- 60 Mtr legs = 43.00 ft
- 40 Mtr legs = 34.08 ft

Parts List

- 2x 1.5 in x 10 ft Schedule 40 PVC pipe - cut to 7.5 ft lengths
- 1x 1.5 in. compression coupler (joint connector)
- 1x 1.5 in. slip coupler
- 2x 1 in x 10 ft Schedule 40 PVC pipe - cut to 2.5 ft lengths (6 ea needed)
- 6x 1 in end caps
- 6x 5/8 in Schedule 20 PVC pipe - Cut to 6 in lengths - Drill hole for wire (6 ea needed)
- 1x 6 ft "T" fence post (fits inside center support)
- 6x 18 in metal stakes
- 1x 50 Ohm feed point (Dipole center insulator)
- 275 ft antenna wire - insulated 14 ga.
- 2x 8.5 in. wire pig tails - transition

from feed point to wire elements

- 2x Short non-conductive strain reliefs
- 2x Split bolts or 5 hole grounding bars
- Coax to reach the transmitter

Assembly

You can get as simple as you want or you can get creative and make it more involved. As with all amateur radio gear, modifications can be made and experimenting with this design may result in even better performance for your chosen area of operation.

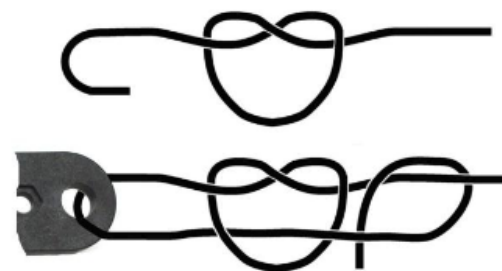
1. Cut the wires to the assembled length
2. Attach the wires to the balun
3. Raise the centre post to 15 feet
4. Prepare the 4 anchor points as shown in the photo.
5. Run the wires out to a point 2.5 feet above ground at right angles as shown in the diagram and secure to the anchor points.
6. Double-check all connections
7. Place caution tape at all lower points or secure the anchor posts so that they cannot be touched. They may be at high voltage during transmission.

Good luck and we hope you pick up some of those close HF stations.



Above: Anchor post detail

Below: Securing the wire

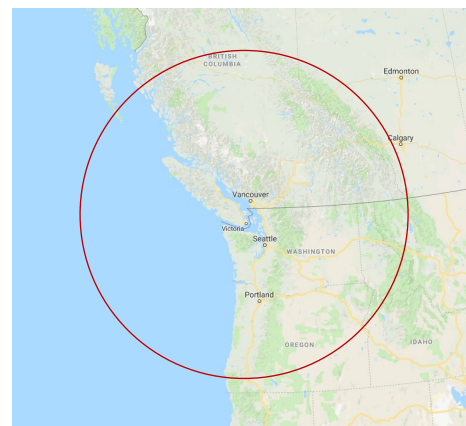
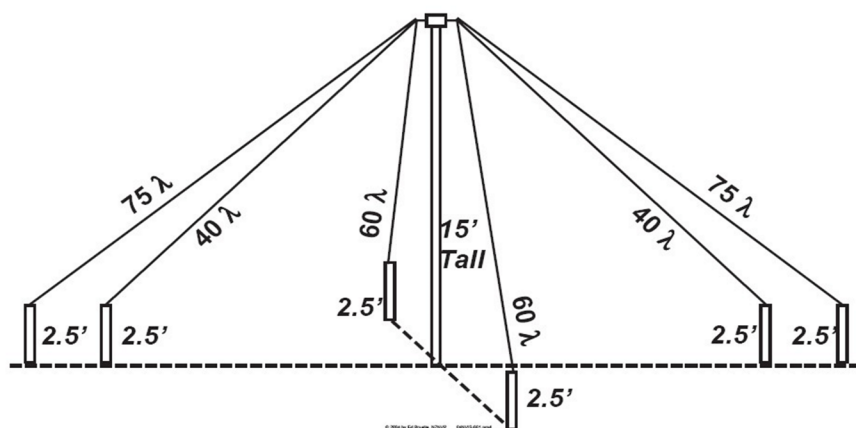


Below: The balun



April 2019

NVIS Tri-Band Antenna for 75, 60, & 40 Meters.
Side View



NVIS antenna plan and approximate coverage area, subject to conditions.

Canadian National Parks On The Air—Fort Langley Historic Site Operation

This schedule covers amateur radio operation, at the “Fort” at Fort Langley, for Coquitlam, Langley and Surrey amateur radio clubs but allows each organization to invite guest operators. However, at no time will the total number of operators exceed the limits as set out in this document.

The area selected for the amateur radio CNPOTA operation is known as the “Orchard” and is located south of the Fort proper. Locating radio antennas including a mobile tower between the south Fort wall and the large tree (approximately 200 ft) south of the wall will provide the best opportunity for the promotion of the Langley Fort through amateur radio. Radios and related equipment will be located within a 200’ radius of the antennas. Trees in the Orchard area may be used to support wire antennas.

Should it be more advantageous for promoting the Fort and demonstrating amateur radio communications the radios and operating positions, but not the antennas, could be setup within the fort proper in the designated area located in the back, south/east corner.

Setup and operation of the amateur radio stations for CNPOTA will be the responsibility of the Coquitlam, Langley and Surrey amateur radio clubs following the guidelines set out by the Fort. Each

club or combination of clubs will request dates for operation between July 4th and August 31 with the following exclusions:

1. July 14th (Peninsula runners)
2. July 20th , 21st (Grand Fondo)
3. August 3rd (Brigade days)
4. August 5th (Makers market)
5. August 28th (3 concert)

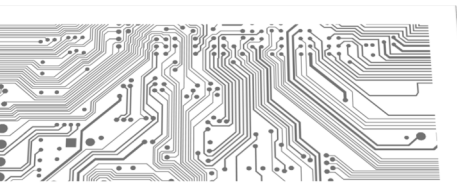
Requests for operating dates complete with a written plan of equipment, antennas and, where possible, a list of operators must be submitted to Fred VE7IO no later than May 1st 2019 for coordination. Once coordinated your request will be submitted to the Fort for final approval.

~ Fred VE7IO



Canadian
National Parks
ON THE AIR **2019**





TECH TOPICS

Daniel Romila VE7LCG

Large Networks of Permanently Connected Repeaters

The number of ham radio operators is in decline. This is a worldwide situation. There are many reasons why this happens and many people talk about it on the Internet. One phrase that I liked most belongs to Peter Sichel and was published at: <https://www.quora.com/What-ever-happened-to-ham-radio-There-were-once-thousands-of-DXers-Are-they-still-at-it-or-have-they-gone-online>

I quote from the discussion published there:

“Ham radio was widely seen as cool and conferred special capabilities.”

Well, that was the situation long time ago. Europe and especially Eastern Europe had a “come back” of ham radio immediately after 1990, when the communist régime collapsed and tons of equipment was available for free from the West. It is true that this was not new equipment - it was 10–20 years old. I remember

working with a Yaesu Sommerkamp FT-7(B) that was made in 1980, so it was ten years old at that time.



Western Europe also saw a renewed interest due to the availability of DXs/callsigns from Eastern Europe. A lot of Russian military radio equipment was decommissioned from Eastern Europe armies and given to ham radio; plenty of components to work with. I still remember the EMF 500 filters, Russian made at that time, that somehow arrived in my hands, too.



So, the solution was to make it cool again. EchoLink and SVXlink combined radio and Internet networks, and made it easier to work DX and participate in ham radio activities all over the globe. After reading a bunch of articles, my understanding is that the revival of ham radio movement is based on 2 main ideas:

- Underline emergency use;
- Present it as a hobby and as belonging to a “gang” (LOL)

I will tell you about two large networks of repeaters for ham radio use that were made in the spirit of both of these two ideas. The main purpose of these networks was to be capable to cover as much territory as possible, whole countries and even inter-continental, permanently with a cheap analog walkie-talkie.

The first such network I will present is RoLink, covering Romania and Moldavia (ex part of USSR)

The network is made up of repeaters and hot spots that are permanently connected to the Internet via SVXlink. Those repeaters and hot spots cannot be individually accessed through the Internet, but can as a whole via EchoLink, node 476786. Via Internet this EchoLink node accesses the repeater YO3KXL situated in Bucharest, the capital of Romania. This repeater is in the 70 cm band and it belongs to the University of Electronics, Telecommunications and IT. It has a coverage of 90 km, which is modest by Canadian standards. But



April 2019

please keep in mind the density of the population is different in Europe. It fully covers four big towns in Romania, including the capital city. These are four separate towns, not like Surrey and Vancouver, for example, which belong to a single metropolitan area. A hundred kilometers means passing several country callsigns.

The network does not include all the available repeaters. There are other Romanian repeaters that can be accessed via EchoLink and which are not connected to the RoLink, and repeaters that cover local needs and are not connected to anything else.

One important aspect of those permanent networks done with SVXlink are the hot-spots, which are mini repeaters in themselves.

For example, I was talking via RoLink with YO9FDX, a ham radio from Ploiesti, a town in the interior of Romania. He is one of a hundred owners of hot spots done with Raspberry Pi hardware and SVXlink software. He connected his 20 Watts base station to the "box". The box is connected to the Internet. He has in hand a cheap walkie talkie and can walk around his building and in town and still be connected to RoLink. I cannot access his personal Internet node - when I am connected to him I am connected and heard in at least two countries. Other people can also use his node for free and any other node that is available in the area. So even if there isn't a strong dedicated repeater in a certain area, it is still possible to connect to the national network based on private personal nodes.

The main language used is Romanian. Romanian is the language spoken in Romania

and Moldavia, but English is OK and people will respond. Most of the activity is between 7 AM and 10 AM, Romanian time. The official RoLink website is <http://www.439100.ro/content/blog/home/>

Unfortunately, there is no English version, but on the web there is a form to buy RoLink a node. Because there are so many in operation, there is voluntary cooperation for allocating a limited number of the twelve channels for everyone using RoLink. If you hear another private node in use on some channels, you are strongly advised to use a free channel.

The RoLink network spills over into neighboring countries. I had many connections via RoLink with Trajan, YU7NTY (Serbia - ex Yugoslavia). I was connected to EchoLink on my computer on node 476786, and he was connected with his radio transceiver with a repeater from Timisoara, Romania. He had strong signals all the time, as if he himself was connected to EchoLink, which he was not. A picture of his antennas [right].



One has to keep in mind that whenever one uses such a large network, you are heard in several countries at once. There is a courtesy rule not to keep the network busy for a long time. Have a QSO, let others have a QSO, and come back for another QSOs. There is a delay between pushing the TALK button and the moment when your contact can actually hear you. You leave some 2-3 seconds of silence each time when you start talking.

I think the above description of RoLink gives you an idea about what this network is and what it can do. Unfortunately there is not much information in English about it.

	Canal	RX	TX	Ton emisie
Repetitoare UHF	RoLink 01	439.050	431.450	103.5
	RoLink 02	439.075	431.475	103.5
	RoLink 03	439.100	431.500	103.5
	RoLink 04	439.125	431.525	103.5
Simplex VHF	RoLink 09	145.2875	145.2875	103.5
	RoLink 10	145.3375	145.3375	103.5
	RoLink 11	145.3875	145.3875	103.5
	RoLink 12	145.4125	145.4125	103.5

Searching on youtube.com about RoLink you would mostly get music video clips of the Danish singer Tippy Rolink:

<https://www.youtube.com/watch?v=SmKGWCKnMGc>

and of the near Glasgow singer Marina Rolink:

<https://www.youtube.com/watch?v=1tbUDvsEOx4>

Thank you if you are still reading my article instead of immediately clicking the above links. I watched the singers, and spent a half hour there instead of writing this article, so maybe you should abandon my article (LOL).

The last large network of repeaters that I want to write about is the French Open Network. Its name is almost all the information you can find about it in English. It covers parts of Quebec, France, Switzerland, Belgium and - of course - it spills over neighboring countries. It can be accessed via EchoLink in a single node 282229, and it is also based on SVXlink software for Linux.

This is a bigger network than RoLink and the rules are more strict. After several minutes in a QSO it is possible that somebody will tell you to keep quiet for a while. The French Open Network has a gateway for DMR, C4FM and D-STAR.

I repeat, the only EchoLink access node is 282229. All information I already wrote about hot spots in RoLink is the same for French Open Network.

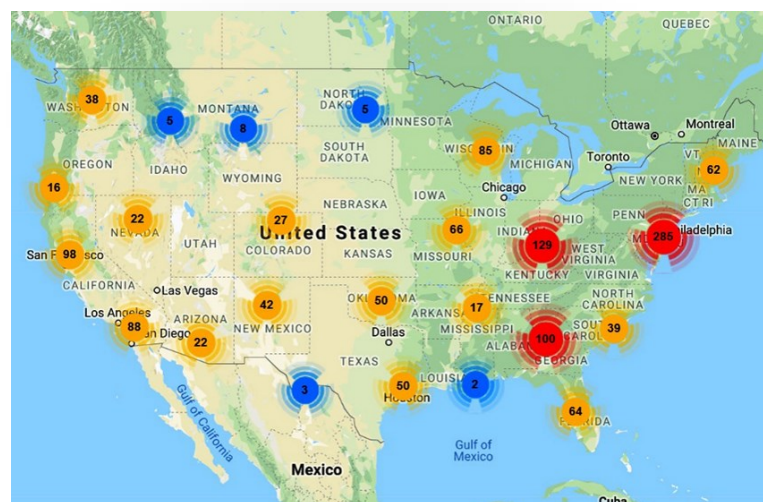
I will end my article here. Both of these large networks of permanent repeaters do not use English, so I did not expand with more details on them. The intention of those networks is to gang together ham radio persons with a minimum of technical knowledge and minimum equipment. A cheap Baofeng costing C\$27, shipping and taxes included, is enough for an electronics engineering student from Paris to talk in front of his girlfriend with somebody from Belgium or Switzerland to discuss the latest disco trends. Cool, isn't it?

We should remember that aside from the licensed VHF/UHF ham radio bands there are also free communication radio services, like FRS and GMRS. Canada does not allow repeaters for those free radio services, but other countries, like the United States do. There are plenty of such repeaters South of the border and a good source of information is <https://mygmrs.com/>

Have a look at the such USA repeaters' map:

Sooner or later we will see a kind of continental free radio service, something like the almost defunct CB (citizen band). Cool, isn't it?

~ Daniel VE7LCG



April 2019



World Amateur Radio Day—April 18th

Every April 18, radio amateurs worldwide take to the airwaves in celebration of World Amateur Radio Day. It commemorates the day in 1925 that the International Amateur Radio Union was formed in Paris. IARU member-societies are encouraged to take advantage of this special day to promote amateur radio in their country. The IARU from time to time also becomes involved in other special projects related to amateur radio.

In addition, the three regional IARU organizations sponsor their own activities such as Amateur Radio Direction Finding (ARDF) championships.

Amateur Radio experimenters were the first to discover that the short wave spectrum — far from being a wasteland — could support worldwide propagation. In the rush to use these shorter wavelengths, Amateur Radio was “in grave danger of being pushed aside,” the IARU’s history has noted. Amateur Radio pioneers met in Paris in 1925 and created the IARU to support Amateur Radio worldwide.

Just two years later, at the International Radiotelegraph Conference, Amateur Radio gained the allocations still recognized today — 160, 80, 40, 20, and 10 meters. Since its founding, the IARU has worked tirelessly to defend and expand the frequency allocations for Amateur Radio. Thanks to the support of enlightened administrations in every part of the globe, radio amateurs are now able to experiment and communicate in frequency bands strategically located throughout the radio spectrum. From the 25 countries that formed the IARU in 1925, the IARU has grown to include 160 member-societies in three regions. IARU Region 1 includes Europe, Africa, the Middle East, and Northern Asia. Region 2 covers the Americas, and Region 3 is comprised of Australia, New Zealand, the Pacific island nations, and most of Asia. The

International Telecommunication Union (ITU) has recognized the IARU as representing the interests of Amateur Radio.

Today, Amateur Radio is more popular than ever, with over 3,000,000 licensed operators!

World Amateur Radio Day is the day when IARU Member-Societies can show our capabilities to the public and enjoy global friendship with other Amateurs worldwide.

You can promote your WARD activity on social media by using the hash tag #WARD2015 on Twitter and Facebook. IARU will list all WARD activities on this page. April 18 is the day for all of Amateur Radio to celebrate and tell the world about the science we can help teach, the community service we can provide and the fun we have.

Malaysia: On 18 April 2019 9M4CMN (9w2pck@marts.org.my) will be on the air from Segamat, Southern Malaysia and 9M4CKK (9m2cio@marts.org.my) will be active from Tumpat, East Coast of Malaysia from 0230hrs to 1530hrs UTC.

Worldwide: The World Radio Network and the World Friendship Net will be participating in World Amateur Radio Day 2019.

For the second time in a row, the special event call sign W2W has been secured for this event. As well there will be a commemorative special event “WORLD AMATEUR RADIO DAY 2019” QSL Card. We will have a 12 hour net with 10 different net controllers from all over the world.

Please join us as we celebrate amateur radio all around the world on 18 April at 16:00 UTC via ECHOLINK on the “World” Conference server (IRLP 9251) and for the first time on Allstar Node #47620 - World Conference Hub.



Onno VK6FLAB

What are you proud of?

Often we forget the things we've done or achieved and every now and then it seems like a solid use of time to reflect a little on what went before and what that did. Recently I asked various amateurs what they were proud of having done or achieved in the past year, their little personal victory, their thrill to keep coming back to the hobby.

For me it was the research and production behind "Is man-made noise really vertical?".

It took several weeks to research and produce and received only a handful of responses on social media or via email, even though it was downloaded and read about 10,000 times or so. For me it gives me a thrill to have spent time digging into the Who, What, Why, When, Where and How of a topic that seems steeped in myth and often remains unexplained or unexplored.

One amateur shared that they'd made their first HF contact from Perth to Romania, one had gotten their license this year after procrastinating for 30 years, another came back to the hobby after being away for a decade. There was an amateur who managed to set-up a rotatable Yagi on 6m.

There were a couple of amateurs who have each been building a repeater network, another who built a 6m Yagi antenna and pre-amplifier, another who

erected their tower after 5 years, another who managed to get an article published in the national amateur radio magazine, another who set-up their G5RV and connected it to an Air Spy to make WSPR spots after only a year and a half in the hobby.

One amateur got their license upgrade and is looking forward to learning CW next year, another got their station fully set-up and returned to being an active radio amateur. There was an amateur who managed to get through a 20m SSB pile-up.

A friend told me that their achievement of the year was to listen, both to others and themselves. There was an amateur who used 10 Watts to make a contact between Massachusetts and New Zealand, one who worked the SO-50 satellite with a Baofeng radio and a rubber duck antenna. One amateur managed to work AO-92 with the same type of gear, made two contacts and even has a recording from one of them.

One amateur celebrated the arrival of their Bengali key, considering it Christmas before Christmas. One amateur who made their first contact between Texas and the Netherlands used a 20m self-built Moxon beam constructed from wire and fishing poles.

There was an amateur who got their license and is impatient to get on air,

April 2019

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it's been a week of waiting. One person upgraded to the top license class and actually started operating. One aspiring amateur was inspired by how easy it was to get licensed and is planning for their entrance as a licensed ham in the new year, mind you, that didn't stop him from listening and decoding a NOAA satellite image using an RTL dongle.

One amateur decided that he just couldn't wait for his license, studied three days and passed his test. He's now building his first radio, looking forward to making a contact.

There's an amateur who joined the ranks and is now looking forward to going for an upgrade to his license next year. One ham has been licensed for 10 months and is already having a blast, erected his first real tower and now has a VHF antenna at 60ft, that's 20m up in the air.

There's one amateur who has been learning about what a cheap RTL-SDR dongle can do with SDR# and he's saving up for an Icom 7300. He's finding it tough to balance between spending his money on high-end audio and saving for his Icom. Take it from me, the radio wins, every time!

I've only scratched the surface of the activities undertaken in the past 12 months, but it's clear that being an amateur is a positive experience for many people, getting on air and making noise, learning, having fun, trying things and exploring this wonderful hobby is ingrained in much of the community.

Before wrapping up, I'd also like to credit Will VK6UU for independently asking the same question and for the countless amateurs who responded, many of whom I wasn't able to squeeze in this time around. Perhaps I should do this more often.

What's your proudest moment in the past 12 months? Let me know.

To listen to the podcast, visit the website: <http://podcasts.vk6flab.com/>. You can also use your podcast tool of choice and search for my callsign, VK6FLAB. Full instructions on how to listen are here: <https://podcasts.vk6flab.com/about/help>

All podcast transcripts are collated and edited in an annual volume which you can find by searching for my callsign on your local Amazon store, or visit my author page: <http://amazon.com/author/owh>. Volume 7 is out now.

Feel free to get in touch directly via email: cq@vk6flab.com, follow on twitter: @vk6flab (<http://twitter.com/vk6flab/>) or check the website for more: <http://vk6flab.com/>

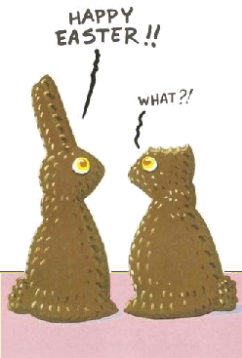
If you'd like to join a weekly net for new and returning amateurs, check out the details at <http://ftroop.vk6flab.com/>, the net runs every week on Saturday, from 00:00 to 01:00 UTC on Echolink, IRLP, AllStar Link and 2m FM via various repeaters.

~ I'm Onno VK6FLAB

From 2019-03-28 until 2019-05-28, the Canadian Amateur Radio Service Center has authorized the following prefixes, celebrating the 50th Anniversary of the Official Languages Act of Canada - Celebrating Canada's Two Official Languages.

In BC, for VA7 use CJ7, for VE7 use CK7





It's April

We have a special guest at our April 10th meeting, Alex VE7DXW's will provide a presentation on "How Shortwave Radios Can Detect Earthquakes". For a couple of years Alex has been working on this project and has developed an 'RF Seismograph' which is stationed at his home in North Vancouver.

In March, there was an M6.1 earthquake in El Dovia, Colombia. The earthquake was reported by USGS right after it occurred. but the 80m noise picked up by the RF Seismograph occurred almost 12 hours before the quake. This is a promising earthquake prediction tool. If you wish some pre-reading, see:

www.ep.sci.hokudai.ac.jp/~heki/pdf/Scientific_American_Vance2018.pdf

Please join us, visitors always welcome.

SARC hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228.

On UHF we operate a repeater on 443.775MHz (+5MHz) Tone=110.9 or IRLP Node 1737.

	SARC Net 20:00 Hrs
1 st Tuesday Standby	Drew VA7DRW Dixie VA7DIX
2 nd Tuesday Standby	Jinty VA7JMR Sheldon VA7XNL
3 rd Tuesday Standby	Rob VE7CZV Vacant
4 th Tuesday Standby	Kapila VE7KGK John VA7XB
5 th Tuesday Standby	Robert VA7FMR John VE7TI
Want a turn at Net Control? Contact the SARC Net Manager	

Down The Log...

SARC Monthly Meetings

2nd Wed. (Sept-Jun)
1900 hr at the PREOC
Emergency Mgmt BC
14292 Green Timbers
Way, Surrey, BC

Weekly SARC Breakfast

Saturday between 0800
and 1000 hrs at the
Kalmar Family Restaurant
8076 King George Blvd.
Surrey

SARC Net

Tuesday at 2000 hr local
on 147.360 MHz (+)
Tone=110.9

SEPARS Net

Tuesday at 1930 hr local
on 147.360 MHz (+)
Tone=110.9

VE7RSC Repeaters

2m: 147.360MHz+
Tone= 110.9Hz
IRLP node 1736
Echolink node 496228

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Tone=110.9

70cm: 443.775MHz+
Tone= 110.9Hz
IRLP node 1737



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